UNITED S
ENVIRONMENTAL

C. ICAGO, ILLINOIS

DATE: FEB 2 3 1990

SUBJECT: **Review of Region 5 data for** ALLIED-SIGNAL

FROM: **Curtis Ross, Director** Chi Yang for
Region 5 Central Regional Laboratory

To: **Data User:**

Attached are the results for:

CRL Data Set Numbers: RCRA 6972 SAS 5064E
Sample Numbers: 90KP02501-S12, D12 (13)
Parameter(s): Chloride, Fluoride, Sulfate, % Total solids
Laboratory: VERSAR, INC.

Results Status:

( ) **DATA ACCEPTABLE FOR USE***
(✓) **DATA QUALIFIED AS TO USE**
( ) **DATA UNACCEPTABLE FOR USE**

* For data acceptability requirements, refer to the method capability statement for the methods referenced.

Comments by the Quality Control Coordinator:

If there are any questions regarding the data, refer them to David Payne, the Quality Control Coordinator, at 3-3805

Please sign and date this form below and return it with any comments to:

Sylvia Griffin
Data Management Coordinator
Region 5 Central Regional Laboratory
(5SCRL)

TRANSMITTED BY
FEB 2 3 1990

U.S. EPA CENTRAL
REGIONAL LAB

RECEIVED BY/DATE:

Comments:

62

Filed by/date:

SAS 5064E

DATA SET	SITE	DU/ACT.
RCRA 6972	Allied Signal	AGD / AGD207

SAMPLES	PARAMETER(S)
90KP02501-S12, D12	Cl, F, SO4

SAMPLED	RECEIVED (PAPERWORK)	DUE	LAB
11/6-7/89	2/5/90	2-23-90	VERSAR, INC

SHIPPED	DATA RECEIVED	CONTRACT
11-7-89	2-8-90	

AVG
Cl – 8 - 1800 – 100.
F – 6 - 1070 - 270

Comments By Reviewer:

THIS REVIEW COVERS 13 SOIL SAMPLES FOR CHLORIDE, FLUORIDE, SULFATE AND TOTAL SOLIDS. ALL HOLDING TIMES WERE MET.

CHLORIDE ANALYSIS ALL QC/QA ARE ACCEPTABLE EXCEPT FOR THE EXTRACTION SPIKE. THE SAS CALLS FOR ADDITION OF THE SPIKE BEFORE EXTRACTION. IN THIS CASE IT WAS ADDED AFTER EXTRACTION AND IS NOT ACCEPTABLE AS A VIABLE SPIKE VALUE.

FLUORIDE ANALYSIS ALL QC/QA ARE ACCEPTABLE

SULFATE ANALYSIS RESULTS ARE ESTIMATED. THE EXTRACTED DUPLICATES INDICATE A PROBLEM IN REPRODUCABILITY OF EXTRACTION SAMPLES.

TOTAL SOLIDS ALL QC/QA ARE ACCEPTABLE

( ) REVIEWED ( ) UNREVIEWED TEAM LEADER/DATE — Raymond Parr 2-23-90

( ) REVIEWED ( ) UNREVIEWED SECTION CHIEF/DATE

( ) REVIEWED ( ) UNREVIEWED QC COORDINATOR/DATE

VIEWED BY CONTRACT COORDINATOR/DATE

RECEIVED	TRANSMITTED	DATA MANAGEMENT COORDINATOR
2/23/90	2/23/90	S Griffin

CC: QUALITY CONTROL COORDINATOR

Versar INC.

ANALYTICAL DATA PACKAGE
General Chemistry Section

DATE: 07-Feb-90
CONTROL #: 1458
CLIENT: EPA SMO Region 5
CASE: 5064 E
PROJECT / BATCH: 430.15-1

Versar INC.

GENERAL CHEMISTRY SECTION

ANALYSIS NARRATIVE

Date: February 7, 1990
Project #: 430.15.0-1
Control #: 1458
Case #: 5064 E
Project description: EPA Inorganic SAS

This project consisted of 13 soil samples for the analysis of chloride, fluoride, sulfate, and total solids on the wet and air dried sample. These samples were received at Versar on November 8, 1989. All data, except total solids, is reported on an oven-dried basis. The average of duplicate analyses is reported on the Analysis Report page.

The chloride analysis was begun by air drying the samples. The samples were ground and mixed, and extracted at a 1:5 soil to water ratio. Twenty grams of soil was mixed with 100 ml of deionized water and put on a shaker for one hour, then filtered. The samples were extracted for chloride on December 8, 1989, and analyzed on December 28, January 5, and January 8. Method 407B from Standard Methods for the Examination of Water and Wastewater (SM), 15th Ed. was used for analysis of the extracts. The titrant was standardized each day, and a titration blank was also determined daily. The standardization and titration information, as well as the order of sample determinations, is on the raw data pages. Sample extracts with concentrations greater than approximately 100 mg/L were diluted prior to analysis. All check standards, blanks, duplicates and spikes were within limits. The samples were spiked after extraction. Due to time constraints, the samples were not reextracted with the spike added directly to the soil.

The wet sample was used for fluoride analysis. Approximately 5 grams of sample was distilled in 100 ml of deionized water following the procedure in the solicitation for Bellack distillations. The distillate was analyzed by ISE using Method 340.2 from MCAWW, 1983. The samples were extracted between January 5 and January 19, 1990, and were analyzed on January 29. The electrode was calibrated according to method, where the low standard is 0.2 mg/L, which made the detection limit 4.0 mg/kg. The results for calibration checks, method checks (distilled check standards), and duplicate were all within limits. Sample #12 was spiked prior to distillation, but the concentration of spike added was insignificant compared to the sample concentration. The sample was then spiked at the bench. Both spike results are reported. The raw data has been provided

Versar INC.

with calibration information, and the order of sample analysis.

Prior to sulfate analysis, the air dried soil was extracted in the same manner as chloride. To provide a larger volume of extract, 30 grams of soil was extracted in 150 ml of deionized water. These samples were extracted on January 2 and 4, and analyzed on January 4 and 5, 1990. The 48 hour holding time from date of extraction was met. The extracts were analyzed using Method 426C from SM, 16th Ed. Two curves were prepared daily using Buffer A and Buffer B. The calibration information and order of analysis is provided in the attached raw data. All checks and blanks were within specified limits. The RPD for Sample #10 was 28%. The sample duplicate was analyzed twice at the bench to confirm the result. The average is reported. All other duplicate and spike results were within limits. Samples #01, 02 and 06 were reextracted on January 4. The original extract was centrifuged to try to eliminate suspended particles but were broken during the process. The second extract was filtered through 0.45um Acrodiscs just prior to analysis to reduce the number of suspended particles.

The percent total solids was determined on air dry and wet sample aliquots, as per SOW 787. These results were used to adjust the data to an oven dry weight basis. The duplicate results were within limits, as were the blank results. The raw data is provided.

Christina C. Thompson

Christina C. Thompson
Section Chief
General Chemistry

Versar INC.

GENERAL INORGANIC CHEMISTRY SECTION
Quality Assurance Report
Section I

PROJECT: 430.15.0-1
CASE: 5064 E
CONTROL #: 1458

DATE: 06-Feb-90
PAGE: 1

PARAMETER: Chloride

Quality Control	Chloride (mg/L)				
Date of Analysis	12/28/89	01/05/90	01/08/90		
INITIAL CAL. VERIF.					
Source:	Versar Std.	Versar Std.			
True	75.0	75.0			
Measured	75.5	74.3			
% Recovery	101%	99%			
Calibration Blank	NA	NA			
CONTINUING CAL. CHECK					
Source:	Versar Std.	Versar Std.			
True	75.0	75.0			
Measured	74.5	75.2			
% Recovery	99%	100%			
Source:					
True					
Measured					
% Recovery					
EPA METHOD CHECK					
Source:			EPA 987		
True			52.1		
Measured			50.6		
% Recovery			97%		
Reagent Blank	<5.0 mg/kg	<5.0 mg/kg			
Detection Limit	5.0 mg/kg	5.0 mg/kg			

Versar INC.

GENERAL INORGANIC CHEMISTRY SECTION
Quality Assurance Report
Section I

PROJECT: 430.15.0-1
CASE: 5064 E
CONTROL #: 1458

DATE: 06-Feb-90
PAGE: 2

PARAMETER: Fluoride

Quality Control	Fluoride (mg/L)			
Date of Analysis	01/29/90			
INITIAL CAL. VERIF.				
Source:	EPA 378 #12			
True	1.08			
Measured	1.14			
% Recovery	106%			
Calibration Blank	<0.20			
CONTINUING CAL. CHECK				
Source:	EPA 378 #12			
True	1.08			
Measured	1.12			
% Recovery	104%			
Source:	EPA 378 #12			
True	1.08			
Measured	1.14			
% Recovery	106%			
Source:	EPA 378 #12			
True	1.08			
Measured	1.18			
% Recovery	109%			
METHOD CHECK STD				
Source:	Versar Std.			
True	1.00			
Measured	0.94			
% Recovery	94%			
Source:	Versar Std.			
True	1.00			
Measured	0.93			
% Recovery	93%			
Source:	Versar Std.			
True	1.00			
Measured	0.92			
% Recovery	92%			
Reagent Blank 1	<4.0 mg/kg			
Reagent Blank 2	<4.0 mg/kg			
Reagent Blank 3	<4.0 mg/kg			
Detection Limit	4.0 mg/kg			

Versar INC.

GENERAL INORGANIC CHEMISTRY SECTION
Quality Assurance Report
Section I

PROJECT: 430.15.0-1 DATE: 06-Feb-90
CASE: 5064 E PAGE: 3
CONTROL #: 1458

PARAMETER: Sulfate

Quality Control	Sulfate (mg/L)			
Date of Analysis	01/04/90	01/04/90	01/05/90	01/05/90
INITIAL CAL. VERIF.	Buffer A	Buffer B	Buffer A	Buffer B
Source:	Versar Std.	Versar Std.	Versar Std.	Versar Std.
True	20.0	5.0	20.0	5.0
Measured	20.9	5.0	20.8	5.2
% Recovery	105%	100%	104%	104%
Calibration Blank	NA	(1.0	NA	(1.0
CONTINUING CAL. CHECK				
Source:	Versar Std.	Versar Std.	Versar Std.	Versar Std.
True	20.0	5.0	20.0	5.0
Measured	20.8	4.9	20.9	5.1
% Recovery	104%	98%	105%	102%
Source:	Versar Std.			
True	20.0			
Measured	20.7			
% Recovery	104%			
EPA METHOD CHECK				
Source:	EPA 987			
True	20.0			
Measured	20.5			
% Recovery	103%			
Reagent Blank	NA	(5.0 mg/kg	NA	NA
Detection Limit	50.0 mg/kg	5.0 mg/kg	50.0 mg/kg	5.0 mg/kg

Versar INC.

GENERAL INORGANIC CHEMISTRY SECTION
Quality Assurance Report
Section II

PROJECT: 430.15.0-1
CASE: 5064 E
CONTROL #: 1458

DATE: 06-Feb-90
PAGE: 1

Quality Control Sample	Chloride (mg/kg)	Fluoride (mg/kg)	Sulfate (mg/kg)	% TS (wb)*	% TS (adb)*
EXTRACTED DUPLICATE ANALYSES					
Sample ID I	5064E13	5064E12	5064E09	5064E13	5064E13
Sample Value	77.4	247	80.4	82.3	98.9
Duplicate Value	77.5	249	97.0	83.1	98.7
% RPD	0.1%	0.8%	18.7%	1.0%	0.2%
Sample ID II	5064E05		5064E10		
Sample Value	608		162		
Duplicate Value	626		215		
% RPD	2.9%		28.1%		
BENCH DUPLICATE ANALYSES					
Sample ID I			5064E10		
Duplicate Value			215		
Bench Duplicate			210		
% RPD			2.4%		
EXTRACTED SPIKE ANALYSES					
Sample ID I		5064E12	5064E04		
Mean Result		248	364		
Spike Result		232	482		
Spike Added		20.0	98.2		
% Recovery		**	120%		
Sample ID II			5064E05		
Mean Result			194		
Spike Result			285		
Spike Added			91.7		
% Recovery			99%		
BENCH SPIKE ANALYSES					
Sample ID I	5064E13	5064E12			
Mean Result	77.4	248			
Spike Result	227	760			
Spike Added	148	477			
% Recovery	101%	107%			
Sample ID II	5064E05				
Mean Result	617				
Spike Result	1990				
Spike Added	1380				
% Recovery	99%				

* wb = wet basis
adb = air dried basis
** Insignificant amount of spike added

Versar INC.

GENERAL INORGANIC CHEMISTRY SECTION
ANALYSIS REPORT

PROJECT : 430.15-1
CASE : 5064 E
CONTROL # : 1458

DATE :06-Feb-90
PAGE : 1

LAB #	FIELD #	Chloride (mg/kg)	Fluoride (mg/kg)	Sulfate (mg/kg)	% TS (wb)*	% TS (adb)*
86842	5064E01	7.4	189.	6.9	89.6	98.6
86843	5064E02	10.6	102.	52.8	87.2	98.5
86844	5064E03	451.	7100.	256.	80.9	97.6
86845	5064E04	272.	2760.	364.	83.5	98.5
86846	5064E05	617.	199.	194.	82.6	98.2
86847	5064E06	1500.	275.	182.	79.6	99.1
86848	5064E07	85.4	904.	102.	76.0	99.0
86849	5064E08	197.	193.	241.	80.0	97.8
86850	5064E09	36.2	214.	88.7	80.2	97.9
86851	5064E10	629.	203.	188.	82.9	99.4
86852	5064E11	21.4	333.	12.9	81.2	99.1
86853	5064E12	57.5	248.	328.	81.6	98.1
86854	5064E13	77.4	264.	437.	82.7	98.8

* wb = wet basis
adb = air dried basis

C. Thompson
LABORATORY MANAGER

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 5
CHICAGO, ILLINOIS

RECEIVED
JAN 31 1990
RCRA PERMITTING BRANCH
OR/WMD
EPA, REGION V

DATE: JAN 29 1990

SUBJECT: Review of Region 5 data for Allied Signal

FROM: Curtis Ross, Director
Region 5 Central Regional Laboratory

To: Data User: RCRA

Attached are the results for:

CRL Data Set Numbers: Case 13099
Sample Numbers: MEEZ11~83 (13)
Parameter(s): Total metals
Laboratory: Skinner & Sherman Labs

Results Status:

( ) DATA ACCEPTABLE FOR USE*
(X) DATA QUALIFIED AS TO USE
( ) DATA UNACCEPTABLE FOR USE

* For data acceptability requirements, refer to the method capability statement for the methods referenced.

Comments by the Quality Control Coordinator:

If there are any questions regarding the data, refer them to David Payne, the Quality Control Coordinator, at 3-3805

Please sign and date this form below and return it with any comments to:

Sylvia Griffin
Data Management Coordinator
Region 5 Central Regional Laboratory
(5SCRL)

TRANSMITTED BY
JAN 29 1990
U.S. EPA CENTRAL
REGIONAL LAB

RECEIVED BY/DATE:

Comments:

Filed by/date:

DATA SET RCRA	SITE	DU/ACT.
Case 13099	Allied Signal	A80

SAMPLES	PARAMETER(S)
MEEZ11 ~83	Total metals

SAMPLED	RECEIVED	DUE	LAB
			Skinner

SHIPPED	DATA RECEIVED	CONTRACT

Comments By Reviewer: See attached page

( ) REVIEWED ( ) UNREVIEWED TEAM LEADER/DATE

( ) REVIEWED ( ) UNREVIEWED SECTION CHIEF/DATE

( ) REVIEWED ( ) UNREVIEWED QC COORDINATOR/DATE

REVIEWED BY CONTRACT COORDINATOR/DATE

RECEIVED TRANSMITTED DATA MANAGEMENT COORDINATOR

CC: QUALITY CONTROL COORDINATOR

This is a synoptic review of 13 soil samples for Allied Signal, CASE 13099. Antimony and Thallium are biased severely low in the spike, 31 and 8 percent recoveries respectively. Use of the results is not recommended. Aluminum, Barium, Arsenic and Zinc are estimated. Barium and Zinc are estimated because of serial dilution failure. Arsenic is estimated because the LCS did not recover well (81% recovery) and because the frequency of audits was less than the contract level, according to the screening. Aluminum is estimated because the Interelement Correction Factor listing 11A had a correction for aluminum on aluminum. This is ridiculous. A sample does not usually interfere with the analysis of itself and when it does, such as potassium, IEC's are not the way to deal with it.

Marilyn Shannon

TMA
Thermo Analytical Inc.

Skinner & Sherman Laboratories Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200

Federal Express Airbill #5214756256

28 November 1989

USEPA Contract Laboratory Program (CLP)
Sample Management Office (SMO)
300 North Lee Street, Suite 200
Alexandria, VA 22313

Attention: Linda Boynton

Dear Ms. Boynton:

Enclosed is the Sample Data Package for the Inorganic Analyses of Case 13099, SDG #MEEZ71. The samples were analyzed under Skinner & Sherman Work Order #8911059.

Please feel free to call if there are any questions concerning the enclosed.

Sincerely,

SKINNER AND SHERMAN LABORATORIES, INC.

Richard Purdy
Contract Laboratory Program
Program Manager

RP/cd

Encl.

cc: Data Audit Staff, EMSL-LV, Federal #5214756260
Curtis Ross, USEPA Region V, Federal #5214756271

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

SOW No.: 7/88

EPA Sample No.	Lab Sample ID.
MEEZ71	11059-01S
MEEZ71D	11059-01S2
MEEZ71S	11059-01DS
MEEZ72	11059-02S
MEEZ73	11059-03S
MEEZ74	11059-04S
MEEZ75	11059-05S
MEEZ76	11059-06S
MEEZ77	11059-07S
MEEZ78	11059-08S
MEEZ79	11059-09S
MEEZ80	11059-10S
MEEZ81	11059-11S
MEEZ82	11059-12S
MEEZ83	11059-13S

Were ICP interelement corrections applied?	Yes/No	YES
Were ICP background corrections applied?	Yes/No	YES
If yes-were raw data generated before application of background corrections?	Yes/No	NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Richard P-Ly Name: Richard Purdy

Date: 27 NOV 89 Title: CLP MANAGER

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ71

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-01S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 88.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8650.00			P
7440-36-0	Antimony	3.50	U	N	P
7440-38-2	Arsenic	10.30		S	F
7440-39-3	Barium	78.60		E	P
7440-41-7	Beryllium	0.52	B		P
7440-41-7	Cadmium	0.44	U		P
7440-70-2	Calcium	41100.00			P
7440-47-3	Chromium	13.70			P
7440-48-4	Cobalt	8.90	B		P
7440-50-8	Copper	18.00			P
7439-89-6	Iron	17700.00			P
7439-92-1	Lead	20.50			F
7439-95-4	Magnesium	14400.00			P
7439-96-5	Manganese	637.00			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	18.50			P
7440-09-7	Potassium	1150.00			P
7782-49-2	Selenium	1.30	U	W	F
7440-22-4	Silver	0.88	U		P
7440-23-5	Sodium	28.90	B		P
7440-28-0	Thallium	0.67	U	N	F
7440-62-2	Vanadium	20.90			P
7440-66-6	Zinc	69.70		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:

STONES

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ72

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-02S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 87.0

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5050.00			P
7440-36-0	Antimony	50.70		N	P
7440-38-2	Arsenic	12.70		S	F
7440-39-3	Barium	61.10		E	P
7440-41-7	Beryllium	1.40			P
7440-41-7	Cadmium	0.68	B		P
7440-70-2	Calcium	59700.00			P
7440-47-3	Chromium	12.10			P
7440-48-4	Cobalt	7.10	B		P
7440-50-8	Copper	151.00			P
7439-89-6	Iron	24900.00			P
7439-92-1	Lead	653.00			F
7439-95-4	Magnesium	3670.00			P
7439-96-5	Manganese	543.00			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	15.90			P
7440-09-7	Potassium	526.00	B		P
7782-49-2	Selenium	1.70			F
7440-22-4	Silver	0.88	U		P
7440-23-5	Sodium	123.00	B		P
7440-28-0	Thallium	0.65	U	N	F
7440-62-2	Vanadium	21.90			P
7440-66-6	Zinc	223.00		E	P
	Cyanide				NR

Color Before: BLACK Clarity Before: Texture: FINE

Color After: BLACK Clarity After: Artifacts: YES

Comments:

STONES

00000

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ73

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-03S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 80.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	25300.00			P
7440-36-0	Antimony	74.00		N	P
7440-38-2	Arsenic	17.80			F
7440-39-3	Barium	148.00		E	P
7440-41-7	Beryllium	0.83	B		P
7440-41-7	Cadmium	0.49	U		P
7440-70-2	Calcium	28800.00			P
7440-47-3	Chromium	30.60			P
7440-48-4	Cobalt	8.00	B		P
7440-50-8	Copper	19.60			P
7439-89-6	Iron	23600.00			P
7439-92-1	Lead	18.80			F
7439-95-4	Magnesium	8900.00			P
7439-96-5	Manganese	483.00			P
7439-97-6	Mercury	0.14			CV
7440-02-0	Nickel	21.00			P
7440-09-7	Potassium	3200.00			P
7782-49-2	Selenium	0.72	U	W	F
7440-22-4	Silver	0.99	U		P
7440-23-5	Sodium	1050.00	B		P
7440-28-0	Thallium	0.72	U	N	F
7440-62-2	Vanadium	54.10			P
7440-66-6	Zinc	72.70		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ74

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-04S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 82.6

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14700.00			P
7440-36-0	Antimony	3.70	U	N	P
7440-38-2	Arsenic	10.10			F
7440-39-3	Barium	116.00		E	P
7440-41-7	Beryllium	0.68	B		P
7440-41-7	Cadmium	0.46	U		P
7440-70-2	Calcium	26800.00			P
7440-47-3	Chromium	20.80			P
7440-48-4	Cobalt	7.90	B		P
7440-50-8	Copper	18.40			P
7439-89-6	Iron	21700.00			P
7439-92-1	Lead	15.00			F
7439-95-4	Magnesium	14700.00			P
7439-96-5	Manganese	540.00			P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	20.70			P
7440-09-7	Potassium	1420.00			P
7782-49-2	Selenium	0.67	U	W	F
7440-22-4	Silver	0.91	U		P
7440-23-5	Sodium	1260.00			P
7440-28-0	Thallium	0.67	U	N	F
7440-62-2	Vanadium	37.60			P
7440-66-6	Zinc	62.80		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

000005

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ75

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-05S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 81.1

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11500.00			P
7440-36-0	Antimony	3.60	U	N	P
7440-38-2	Arsenic	11.50			F
7440-39-3	Barium	110.00		E	P
7440-41-7	Beryllium	0.49	B		P
7440-41-7	Cadmium	0.45	U		P
7440-70-2	Calcium	21100.00			P
7440-47-3	Chromium	17.20			P
7440-48-4	Cobalt	10.20	B		P
7440-50-8	Copper	18.80			P
7439-89-6	Iron	22200.00			P
7439-92-1	Lead	14.90			F
7439-95-4	Magnesium	12300.00			P
7439-96-5	Manganese	773.00			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	22.70			P
7440-09-7	Potassium	926.00	B		P
7782-49-2	Selenium	0.69	U	W	F
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	456.00	B		P
7440-28-0	Thallium	0.69	U	N	F
7440-62-2	Vanadium	31.20			P
7440-66-6	Zinc	61.60		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ76

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-06S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 78.7

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6830.00			P
7440-36-0	Antimony	4.00	U	N	P
7440-38-2	Arsenic	7.80			F
7440-39-3	Barium	59.00		E	P
7440-41-7	Beryllium	0.54	B		P
7440-41-7	Cadmium	0.50	U		P
7440-70-2	Calcium	63300.00			P
7440-47-3	Chromium	12.00			P
7440-48-4	Cobalt	6.30	B		P
7440-50-8	Copper	13.30			P
7439-89-6	Iron	15700.00			P
7439-92-1	Lead	12.10		S	F
7439-95-4	Magnesium	32000.00			P
7439-96-5	Manganese	466.00			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	14.30			P
7440-09-7	Potassium	681.00	B		P
7782-49-2	Selenium	0.73	U		F
7440-22-4	Silver	1.00	U		P
7440-23-5	Sodium	1960.00			P
7440-28-0	Thallium	0.73	U	N	F
7440-62-2	Vanadium	20.80			P
7440-66-6	Zinc	43.60		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

000007

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ77

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-07S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 77.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11800.00			P
7440-36-0	Antimony	3.80	U	N	P
7440-38-2	Arsenic	7.60			F
7440-39-3	Barium	85.40		E	P
7440-41-7	Beryllium	0.71	B		P
7440-41-7	Cadmium	0.48	U		P
7440-70-2	Calcium	46600.00			P
7440-47-3	Chromium	16.40			P
7440-48-4	Cobalt	10.30	B		P
7440-50-8	Copper	16.10			P
7439-89-6	Iron	18900.00			P
7439-92-1	Lead	14.20		S	F
7439-95-4	Magnesium	27900.00			P
7439-96-5	Manganese	750.00			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	22.10			P
7440-09-7	Potassium	1710.00			P
7782-49-2	Selenium	0.76	U		F
7440-22-4	Silver	0.96	U		P
7440-23-5	Sodium	154.00	B		P
7440-28-0	Thallium	0.76	U	N	F
7440-62-2	Vanadium	29.80			P
7440-66-6	Zinc	50.80		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

000003

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ78

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-08S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 79.2

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12300.00			P
7440-36-0	Antimony	4.00	U	N	P
7440-38-2	Arsenic	15.00		S	F
7440-39-3	Barium	129.00		E	P
7440-41-7	Beryllium	0.50	B		P
7440-41-7	Cadmium	0.50	U		P
7440-70-2	Calcium	16600.00			P
7440-47-3	Chromium	19.30			P
7440-48-4	Cobalt	8.40	B		P
7440-50-8	Copper	18.30			P
7439-89-6	Iron	22700.00			P
7439-92-1	Lead	17.40			F
7439-95-4	Magnesium	11200.00			P
7439-96-5	Manganese	645.00			P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	24.20			P
7440-09-7	Potassium	763.00	B		P
7782-49-2	Selenium	0.75	U		F
7440-22-4	Silver	1.00	U		P
7440-23-5	Sodium	83.10	B		P
7440-28-0	Thallium	0.75	U	N	F
7440-62-2	Vanadium	31.10			P
7440-66-6	Zinc	58.20		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

000003

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ79

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-09S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 79.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12300.00			P
7440-36-0	Antimony	3.90	U	N	P
7440-38-2	Arsenic	11.10			F
7440-39-3	Barium	158.00		E	P
7440-41-7	Beryllium	0.81	B		P
7440-41-7	Cadmium	0.48	U		P
7440-70-2	Calcium	14300.00			P
7440-47-3	Chromium	17.50			P
7440-48-4	Cobalt	10.70	B		P
7440-50-8	Copper	19.10			P
7439-89-6	Iron	24000.00			P
7439-92-1	Lead	16.10			F
7439-95-4	Magnesium	9570.00			P
7439-96-5	Manganese	769.00			P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	28.30			P
7440-09-7	Potassium	615.00	B		P
7782-49-2	Selenium	0.70	U		F
7440-22-4	Silver	0.97	U		P
7440-23-5	Sodium	41.90	B		P
7440-28-0	Thallium	0.70	U	N	F
7440-62-2	Vanadium	31.10			P
7440-66-6	Zinc	56.10		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

000020

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ80

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-10S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 80.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8560.00			P
7440-36-0	Antimony	3.70	U	N	P
7440-38-2	Arsenic	15.70			F
7440-39-3	Barium	57.60		E	P
7440-41-7	Beryllium	0.42	B		P
7440-41-7	Cadmium	0.47	U		P
7440-70-2	Calcium	36300.00			P
7440-47-3	Chromium	14.00			P
7440-48-4	Cobalt	9.70	B		P
7440-50-8	Copper	18.60			P
7439-89-6	Iron	17600.00			P
7439-92-1	Lead	14.00		S	F
7439-95-4	Magnesium	13500.00			P
7439-96-5	Manganese	407.00			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	24.50			P
7440-09-7	Potassium	1390.00			P
7782-49-2	Selenium	0.71	U	W	F
7440-22-4	Silver	0.93	U		P
7440-23-5	Sodium	364.00	B		P
7440-28-0	Thallium	0.71	U	N	F
7440-62-2	Vanadium	15.20			P
7440-66-6	Zinc	60.20		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts: YES

Comments:

ROOTS AND STONES

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ81

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-11S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 79.5

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6720.00			P
7440-36-0	Antimony	5.20	B	N	P
7440-38-2	Arsenic	7.30			F
7440-39-3	Barium	48.30	B	E	P
7440-41-7	Beryllium	0.52	B		P
7440-41-7	Cadmium	0.48	U		P
7440-70-2	Calcium	67200.00			P
7440-47-3	Chromium	10.90			P
7440-48-4	Cobalt	7.20	B		P
7440-50-8	Copper	13.50			P
7439-89-6	Iron	15700.00			P
7439-92-1	Lead	16.80		S	F
7439-95-4	Magnesium	29600.00			P
7439-96-5	Manganese	505.00			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	15.80			P
7440-09-7	Potassium	773.00	B		P
7782-49-2	Selenium	1.20	B	+	F
7440-22-4	Silver	0.97	U		P
7440-23-5	Sodium	74.10	B		P
7440-28-0	Thallium	0.71	U	N	F
7440-62-2	Vanadium	17.00			P
7440-66-6	Zinc	45.70		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:

STONES

000013

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ82

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-12S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 81.2

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10800.00			P
7440-36-0	Antimony	3.60	U	N	P
7440-38-2	Arsenic	8.80			F
7440-39-3	Barium	133.00		E	P
7440-41-7	Beryllium	0.68	B		P
7440-41-7	Cadmium	0.46	U		P
7440-70-2	Calcium	44900.00			P
7440-47-3	Chromium	16.70			P
7440-48-4	Cobalt	8.20	B		P
7440-50-8	Copper	15.80			P
7439-89-6	Iron	21500.00			P
7439-92-1	Lead	10.60		S	F
7439-95-4	Magnesium	25300.00			P
7439-96-5	Manganese	570.00			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	19.20			P
7440-09-7	Potassium	677.00	B		P
7782-49-2	Selenium	0.72	U	S	F
7440-22-4	Silver	0.91	U		P
7440-23-5	Sodium	105.00	B		P
7440-28-0	Thallium	0.72	U	N	F
7440-62-2	Vanadium	28.30			P
7440-66-6	Zinc	51.30		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts:

Comments:

000023

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MEEZ83

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Lab Sample ID: 11059-13S

Level (low/med): LOW Date Received: 11/08/89

% Solids: 82.5

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9210.00			P
7440-36-0	Antimony	3.80	U	N	P
7440-38-2	Arsenic	8.50			F
7440-39-3	Barium	102.00		E	P
7440-41-7	Beryllium	0.71	B		P
7440-41-7	Cadmium	0.48	U		P
7440-70-2	Calcium	54500.00			P
7440-47-3	Chromium	14.40			P
7440-48-4	Cobalt	10.90	B		P
7440-50-8	Copper	19.30			P
7439-89-6	Iron	21500.00			P
7439-92-1	Lead	10.30			F
7439-95-4	Magnesium	27400.00			P
7439-96-5	Manganese	619.00			P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	18.40			P
7440-09-7	Potassium	660.00	B		P
7782-49-2	Selenium	0.73	U		F
7440-22-4	Silver	0.95	U		P
7440-23-5	Sodium	114.00	B		P
7440-28-0	Thallium	0.73	U	N	F
7440-62-2	Vanadium	29.20			P
7440-66-6	Zinc	50.10		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts:

Comments:

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	26.0	U	26.0	U	26.0	U	26.0	U	5.200	U	P
Antimony	16.0	U	16.0	U	16.0	U	16.0	U	3.200	U	P
Arsenic	2.0	U	2.0	U	2.0	U	2.0	U	0.400	U	F
Barium	2.0	U	2.0	U	2.0	U	2.0	U	0.400	U	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Cadmium	2.4	B	3.1	B	3.4	B	2.0	U	0.400	U	P
Calcium	25.0	U	25.0	U	25.0	U	32.2	B	5.000	U	P
Chromium	4.0	U	4.0	U	4.0	U	4.0	U	0.800	U	P
Cobalt	3.0	U	3.0	U	3.0	U	3.0	U	0.600	U	P
Copper	3.0	U	3.0	U	3.0	U	3.0	U	0.620	B	P
Iron	16.0	U	16.0	U	16.0	U	16.0	U	3.200	U	P
Lead	2.0	U	2.0	U	2.0	U	2.0	U	0.400	U	F
Magnesium	25.0	U	34.7	B	25.0	U	25.0	U	5.000	U	P
Manganese	2.0	U	2.2	B	2.9	B	2.9	B	0.400	U	P
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.100	U	CV
Nickel	5.0	U	5.0	U	5.0	U	5.0	U	1.000	U	P
Potassium	77.0	U	77.0	U	77.0	U	-121.9	B	-27.210	B	P
Selenium	3.0	U	3.0	U	3.0	U	3.0	U	0.600	U	F
Silver	4.0	U	4.0	U	4.0	U	4.0	U	0.800	U	P
Sodium	-93.5	B	-86.1	B	-75.9	B	-69.4	B	-24.438	B	P
Thallium	3.0	U	3.0	U	3.0	U	3.0	U	0.600	U	F
Vanadium	3.0	U	3.0	U	3.0	U	3.0	U	0.600	U	P
Zinc	5.0	U	5.0	U	5.0	U	5.0	U	1.000	U	P
Cyanide											NR

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			26.0	U							P
Antimony			-25.0	B							P
Arsenic			2.0	U							F
Barium			2.0	U							P
Beryllium			1.0	U							P
Cadmium			2.0	U							P
Calcium			25.0	U							P
Chromium			4.0	U							P
Cobalt			3.0	U							P
Copper			3.0	U							P
Iron			16.0	U							P
Lead			2.0	U	2.0	U	2.0	U			F
Magnesium			37.0	B							P
Manganese			2.9	B							P
Mercury			0.2	U	0.2	U					CV
Nickel			5.0	U							P
Potassium			-85.0	B							P
Selenium			3.0	U							F
Silver			4.0	U							P
Sodium			54.0	U							P
Thallium			3.0	U							F
Vanadium			3.0	U							P
Zinc			5.0	U							P
Cyanide											NR

000023

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	2.0	U	2.0	U							F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead	2.0	U	2.0	U	2.0	U					F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium	3.0	U	3.0	U							F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	2.0	U	2.0	U	2.0	U	2.0	U			F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead											NR
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium	3.0	U	3.0	U	3.0	U	3.0	U			F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

000023

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			2.0	U							F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead											NR
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium			3.0	U							F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081 | MEEZ71S

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix: SOIL Level (low/med): LOW

% Solids for Sample: 88.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	35.4978		3.5184	U	112.13	31.7	N	P
Arsenic	75-125	19.3469		10.3257		8.88	101.6		F
Barium	75-125	507.8322		78.5516		448.52	95.7		P
Beryllium	75-125	10.6567		0.5212	B	11.21	90.4		P
Cadmium	75-125	10.0849		0.4398	U	11.21	90.0		P
Calcium									NR
Chromium	75-125	58.5739		13.7066		44.85	100.0		P
Cobalt	75-125	112.4161		8.8841	B	112.13	92.3		P
Copper	75-125	68.9638		17.9551		56.06	91.0		P
Iron									NR
Lead		23.2995		20.4960		4.44	63.1		F
Magnesium									NR
Manganese		595.0910		637.4548		112.13	-37.8		P
Mercury	75-125	0.5920		0.1079	U	0.51	116.1		CV
Nickel	75-125	121.3527		18.4916		112.13	91.7		P
Potassium									NR
Selenium	75-125	2.0474		1.3324	U	2.22	92.2		F
Silver	75-125	12.2579		0.8796	U	11.21	109.3		P
Sodium									NR
Thallium	75-125	0.9215	B	0.6662	U	11.10	8.3	N	F
Vanadium	75-125	127.5557		20.8974		112.13	95.1		P
Zinc	75-125	175.2060		69.6873		112.13	94.1		P
Cyanide									NR

Comments:

U.S. EPA - CLP

5B
POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081 | MEEZ71A

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix: SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony		119.23		16.00	U	120.0	99.4		P
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

Comments:

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

MEEZ71D

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 88.3 % Solids for Duplicate: 88.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		8651.2039		8233.6258		4.9		P
Antimony		3.5184	U	3.4514	U			P
Arsenic	2.2	10.3257		8.5842		18.4		F
Barium	44.0	78.5516		66.0066		17.4		P
Beryllium		0.5212	B	0.3408	B	41.9		P
Cadmium		0.4398	U	0.4314	U			P
Calcium		41117.4629		50214.1377		19.9		P
Chromium		13.7066		13.1349		4.3		P
Cobalt		8.8841	B	7.0323	B	23.3		P
Copper	5.5	17.9551		15.6286		13.9		P
Iron		17667.0070		16996.8320		3.9		P
Lead		20.4960		17.5647		15.4		F
Magnesium		14407.3849		14923.8108		3.5		P
Manganese		637.4548		532.7298		17.9		P
Mercury		0.1079	U	0.1079	U			CV
Nickel	8.8	18.4916		17.1537		7.5		P
Potassium	1099.5	1151.2582		1112.2050		3.5		P
Selenium		1.3324	U	0.6534	U			F
Silver		0.8796	U	0.8629	U			P
Sodium		28.9062	B	40.9362	B	34.4		P
Thallium		0.6662	U	0.6534	U			F
Vanadium	11.0	20.8974		18.7888		10.6		P
Zinc		69.6873		69.6522		0.1		P
Cyanide								NR

7
LABORATORY CONTROL SAMPLE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D9-0081

Lab Code: SKINER Case No.: 13099 SAS No.: SDG No.: MEEZ71

Solid LCS Source: QAL-0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				325.0	300.6		225.0	424.0	92.5
Antimony				211.0	225.7		127.0	294.0	107.0
Arsenic				917.0	749.4		635.0	1199.0	81.7
Barium				4.8	5.9	B	0.0	40.0	122.9
Beryllium				19.4	18.8		16.5	22.3	96.9
Cadmium				45.4	40.5		35.7	55.1	89.2
Calcium				196200.0	187398.0		166800.0	225600.0	95.5
Chromium				99.6	102.5		79.2	120.0	102.9
Cobalt				144.0	142.2		125.0	162.0	98.8
Copper				6910.0	6672.0		6006.0	7820.0	96.6
Iron				22430.0	22586.0		17770.0	27080.0	100.7
Lead				236.0	248.3		188.0	285.0	105.2
Magnesium				118100.0	119258.0		100400.0	129900.0	101.0
Manganese				208.0	205.4		177.0	239.0	98.8
Mercury				12.7	12.4		8.5	17.0	97.6
Nickel				60.9	55.8		49.2	72.6	91.6
Potassium				50.0	26.6	B	0.0	1000.0	53.2
Selenium				39.2	38.5		19.1	59.4	98.2
Silver				22.2	16.3		15.5	29.0	73.4
Sodium				50.0	11.5	B	0.0	1000.0	23.0
Thallium				39.0	42.8		24.6	53.5	109.7
Vanadium				65.8	69.4		51.7	79.9	105.5
Zinc				187.0	177.2		138.0	236.0	94.8
Cyanide									

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 5
CHICAGO, ILLINOIS

RECEIVED
JAN 31 1990
RCRA PERMITTING BRANCH
OR/WMD
EPA, REGION V

DATE: JAN 25 1990

SUBJECT: **Review of Region 5 data for** Allied Signal

FROM: **Curtis Ross, Director**
Region 5 Central Regional Laboratory

To: **Data User:** RCRA

Attached are the results for:

CRL Data Set Numbers: .....
Sample Numbers: EFR 81 — EFR 93 (13)
Parameter(s): Volatiles
Laboratory: Gulf South Environmental

Results Status:

( ) **DATA ACCEPTABLE FOR USE***
(✓) **DATA QUALIFIED AS TO USE**
( ) **DATA UNACCEPTABLE FOR USE**

* For data acceptability requirements, refer to the method capability statement for the methods referenced.

Comments by the Quality Control Coordinator:

If there are any questions regarding the data, refer them to David Payne, the Quality Control Coordinator, at 3-3805

Please sign and date this form below and return it with any comments to:

Sylvia Griffin
Data Management Coordinator
Region 5 Central Regional Laboratory
(5SCRL)

TRANSMITTED BY
JAN 25 1990
U.S. EPA CENTRAL
REGIONAL LAB

RECEIVED BY/DATE: .....
Comments:

Filed by/date: ____

DATA SET RCRA	SITE	DU/ACT.
	ALLIED SIGNAL	A80/A80 101

SAMPLES	PARAMETER(S)
EFR 81 – EFR 93	VOA

SAMPLED	RECEIVED	DUE	LAB
11-7-89	11-8-89		GULF SOUTH

SHIPPED	DATA RECEIVED	CONTRACT
11-7-89	11-29-89	

Comments By Reviewer:

THIS REVIEW COVERS 13 SOIL SAMPLES FOR VOA ANALYSIS.

QUALIFIERS AND CALIBRATION OUTLIERS ARE NOTED ON THE FOLLOWING PAGES.

T.C. Joseph
1-24-90

( ) REVIEWED ( ) UNREVIEWED TEAM LEADER/DATE

( ) REVIEWED ( ) UNREVIEWED SECTION CHIEF/DATE

( ) REVIEWED ( ) UNREVIEWED QC COORDINATOR/DATE

REVIEWED BY CONTRACT COORDINATOR/DATE

RECEIVED 1/24/90 TRANSMITTED 1/25/90 DATA MANAGEMENT COORDINATOR S Griffin

CC: QUALITY CONTROL COORDINATOR

GULF SOUTH ENVIRONMENTAL LABORATORY

formerly GSRI

Sample Data Package

EPA Contract No. 68-D9-0038

Project No. 6200-3026

Case 13099

Episode(s): CXY

Presented to:

U.S. Environmental Protection Agency
Sample Management Office
Contract Laboratory Program
209 Madison Street, Ste. 200
Alexandria, Virginia 22314

Present by:

Analytical Chemistry Department
Gulf South Environmental Laboratory, Inc.
P.O. Box 26518
New Orleans, Louisiana 70186

November 28, 1989

GULF SOUTH ENVIRONMENTAL LABORATORY
formerly GSRI

Narrative

Case 13099

Post Office Box 26518 • New Orleans, Louisiana 70186 • Phone (504)283-4223 • Fax (504)288-3625

Gulf South Environmental Laboratory
Case 13099

EPA Contract No. 68-D9-0038
SDG No. EFR81

Narrative

Case 13099 consisted of thirteen (13) soil samples which were received by Gulf South Environmental Laboratory on November 8, 1989 and logged in as Episode CXY. The samples were identified as follows:

EFR81	EFR84	EFR87	EFR90	EFR93
EFR82	EFR85	EFR88	EFR91	
EFR83	EFR86	EFR89	EFR92	

The samples were analyzed for volatile organics only according to the low soil procedure. Sample EFR82 required reanalysis because d_8-toluene recovery was high and the response of d_5-chlorobenzene was low. Reanalysis results were similar, so the problem was attributed to the sample matrix. (One volatile reanalysis is being billed.) No other problems were encountered with the analysis.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

Richard R. Whitney , Ph.D.
GC/MS Laboratory Manager

11/28/89
Date

DATA QUALIFIERS

Contractor: GULF SOUTH

Case 13099

Below is a summary of the out-of-control audits and the possible effect on the data for this case:

1) HOLDING TIME:

THE DATA SET MET THE HOLDING TIMES FOR VOA

2) IT MET BFB TUNING CRITERIA

3) CALIBRATION:

OUTLIERS FOR INITIAL AND CONTINUING CALIBRATION ARE NOTED ON THE CALIBRATION OUTLIER FORM.

4) BLANKS:

THERE ARE 2 BLANKS ASSOCIATED WITH THE DATA SET AND THEY SHOWED THE PRESENCE OF METHYLENE CHLORIDE AND 2-BUTANONE. IN ADDITION TO THESE CONTAMINANTS, ACETONE WAS FOUND IN VBLK2. THESE COMPOUNDS WERE NOTED IN SEVERAL ASSOCIATED SAMPLES AT LEVELS <10 TIMES THE BLANK LEVEL. FORM I HAS BEEN FLAGGED UJ AT THE LEVEL INDICATED FOR THESE PARAMETERS.

5) SURROGATE RECOVERY:

VOLATILE SURROGATE RECOVERIES WERE ACCEPTABLE EXCEPT FOR SAMPLE EFR82 (BFB 69%, EFR82 74%, QC LIMITS 74-121%; d8-TOLUENE 137%, EFR82RE 123%, QC LIMITS 81-117%). RESULTS OF EFR 82RE ALONE IS SUBMITTED TO THE DATA USER. THIS IS CONSIDERED AS A MATRIX EFFECT AND NO ACTION IS TAKEN ON THE SAMPLE RESULTS.

6. MATRIX SPK | MSD.

ALL MS|MSD RECOVERIES | RPD WERE ACCEPTABLE.

Reviewed by: CHACKO Joseph

Phone: 353-9085

DATA QUALIFIERS

Contractor: GULF SOUTH

Case 13099

Below is a summary of the out-of-control audits and the possible effect on the data for this case:

NO BASE LINE PROBLEMS WERE OBSERVED. OVERALL, THE DATA SET IS COMPLETE AND RESULTS ARE USEABLE.

Reviewed by: _____

Phone: _____

2B

SOIL VOLATILE SURROGATE RECOVERY

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Level:(low/med) LOW

	EPA SAMPLE NO.	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	OTHER	TOT OUT
01	EFR81	106	87	114	0	0
02	EFR82	137 *	69 *	110	0	2
03	EFR82RE	123 *	74	114	0	1
04	EFR83	103	90	109	0	0
05	EFR84	103	90	108	0	0
06	EFR85	104	95	109	0	0
07	EFR86	103	89	111	0	0
08	EFR87	101	93	110	0	0
09	EFR88	102	92	114	0	0
10	EFR89	102	91	108	0	0
11	EFR90	109	83	112	0	0
12	EFR91	107	88	108	0	0
13	EFR92	102	89	108	0	0
14	EFR93	105	103	97	0	0
15	EFR84MS	106	95	110	0	0
16	EFR84MSD	104	89	110	0	0
17	VBLKL1	99	93	109	0	0
18	VBLKL2	105	105	96	0	0

	QC LIMITS
S1 (TOL) = Toluene-d8	(81-117)
S2 (BFB) = Bromofluorobenzene	(74-121)
S3 (DCE) = 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

3B

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix Spike - EPA Sample No.: EFR84 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	58.8	0	40.6	69	59-172
Trichloroethene	58.8	0	40.7	69	62-137
Benzene	58.8	0	47.4	81	66-142
Toluene	58.8	0	58.0	99	59-139
Chlorobenzene	58.8	0	64.1	109	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	58.8	41.2	70	-1	22	59-172
Trichloroethene	58.8	39.8	68	1	24	62-137
Benzene	58.8	48.1	82	-1	21	66-142
Toluene	58.8	57.6	98	1	21	59-139
Chlorobenzene	58.8	62.5	106	3	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS: EFR84 (LOW SOIL 5 GRS) CASE:13099
RTX-502.2 60M X .53MM 36/4-220@8 INST D

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Lab File ID: DVB111589A Lab Sample ID: VBLKL1

Date Analyzed: 11/15/89 Time Analyzed: 0934

Matrix: (soil/water) SOIL Level:(low/med) LOW

Instrument ID: D

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	EFR81	CXY01	VOCXY01A	1214
02	EFR82	CXY02	VOCXY02A	1246
03	EFR82RE	CXY02RE	VOCXY02AR	1410
04	EFR83	CXY03	VOCXY03AR	1450
05	EFR84	CXY04	VOCXY04AR	1018
06	EFR85	CXY05	VOCXY05A	1328
07	EFR86	CXY06	VOCXY06A	1537
08	EFR87	CXY07	VOCXY07A	1619
09	EFR88	CXY08	VOCXY08A	1704
10	EFR89	CXY09	VOCXY09A	1748
11	EFR90	CXY10	VOCXY10A	1832
12	EFR91	CXY11	VOCXY11A	1917
13	EFR92	CXY12	VOCXY12A	2002
14	EFR84MS	CXY04MS	VOCXY04AMS	1049
15	EFR84MSD	CXY04MSD	VOCXY04AMSD	1130

COMMENTS: VBLKL1 (LOW SOIL) CASE:13099
RTX-502.2 60M X .53MM 36/4-220@8 INST D

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Lab File ID: DVB111689A Lab Sample ID: VBLKL2

Date Analyzed: 11/16/89 Time Analyzed: 1021

Matrix: (soil/water) SOIL Level:(low/med) LOW

Instrument ID: D

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	EFR93	CXY13	VOCXY13A	1113

COMMENTS: VBLKL2 LOW SOIL BLANK #2 CASE:13099
RTX-502.2 60M X .53MM 36/4-220@8 INST D

VOLATILE ORGANICS 1A ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR81

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY01A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 13 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	45	BUJ
67-64-1	Acetone	12	UJ
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	20	BUJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	UJ
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR81

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY01A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 13 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 1 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	76-13-1	ETHANE, 1,1,2-TRICHLORO-1,2,	3.70	21	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR82RE

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY02RE

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY02AR

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 13 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	94	BJ
67-64-1	Acetone	12	UJ
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	2	J
67-66-3	Chloroform	16	
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	29	BuJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	3	J
108-05-4	Vinyl Acetate	12	UJ
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	19	
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR82RE

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY02RE

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY02AR

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 13 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 76-13-1	ETHANE, 1,1,2-TRICHLORO-1,2,	3.68	16	J

VOLATILE ORGANICS 1A ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR83

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY03

Sample wt/vol: 2.5 (g/mL) G Lab File ID: VOCXY03AR

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 16 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	24	U
74-83-9	Bromomethane	24	U
75-01-4	Vinyl Chloride	24	U
75-00-3	Chloroethane	24	U
75-09-2	Methylene Chloride	64	BJ
67-64-1	Acetone	12	J
75-15-0	Carbon Disulfide	12	U
75-35-4	1,1-Dichloroethene	12	U
75-34-3	1,1-Dichloroethane	12	U
540-59-0	1,2-Dichloroethene (total)	12	U
67-66-3	Chloroform	240	
107-06-2	1,2-Dichloroethane	12	U
78-93-3	2-Butanone	50	BUJ
71-55-6	1,1,1-Trichloroethane	34	
56-23-5	Carbon Tetrachloride	34	
108-05-4	Vinyl Acetate	24	UJ
75-27-4	Bromodichloromethane	12	U
78-87-5	1,2-Dichloropropane	12	U
10061-01-5	cis-1,3-Dichloropropene	12	U
79-01-6	Trichloroethene	12	U
124-48-1	Dibromochloromethane	12	U
79-00-5	1,1,2-Trichloroethane	6	J
71-43-2	Benzene	12	U
10061-02-6	Trans-1,3-Dichloropropene	12	U
75-25-2	Bromoform	12	U
108-10-1	4-Methyl-2-Pentanone	24	U
591-78-6	2-Hexanone	24	U
127-18-4	Tetrachloroethene	12	U
79-34-5	1,1,2,2-Tetrachloroethane	12	UJ
108-88-3	Toluene	7	J
108-90-7	Chlorobenzene	12	U
100-41-4	Ethylbenzene	12	U
100-42-5	Styrene	12	U
1330-20-7	Xylene (total)	12	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR83

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY03

Sample wt/vol: 2.5 (g/mL) G Lab File ID: VOCXY03AR

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 16 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	75-69-4	METHANE, TRICHLOROFLUORO-	3.03	46	J
2.	20589-85-9	1-PROPENE, 1,2,3,3-TETRACHLO	17.82	25	J
3.		1-PROPENE,-TRICHLORO-	18.62	34	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR84

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY04

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY04AR

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 15 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	45	B U J
67-64-1	Acetone	17	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	18	B U J
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U J
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U J
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR84

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY04

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY04AR

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 15 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

VOLATILE ORGANICS[1]A ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR85

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY05

Sample wt/vol: 2.5 (g/mL) G Lab File ID: VOCXY05A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 16 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	24	U
74-83-9	Bromomethane	24	U
75-01-4	Vinyl Chloride	24	U
75-00-3	Chloroethane	24	U
75-09-2	Methylene Chloride	52	BJ
67-64-1	Acetone	34	J
75-15-0	Carbon Disulfide	12	U
75-35-4	1,1-Dichloroethene	12	U
75-34-3	1,1-Dichloroethane	12	U
540-59-0	1,2-Dichloroethene (total)	12	U
67-66-3	Chloroform	64	
107-06-2	1,2-Dichloroethane	12	U
78-93-3	2-Butanone	45	BUJ
71-55-6	1,1,1-Trichloroethane	12	U
56-23-5	Carbon Tetrachloride	80	
108-05-4	Vinyl Acetate	24	UJ
75-27-4	Bromodichloromethane	12	U
78-87-5	1,2-Dichloropropane	12	U
10061-01-5	cis-1,3-Dichloropropene	12	U
79-01-6	Trichloroethene	12	U
124-48-1	Dibromochloromethane	12	U
79-00-5	1,1,2-Trichloroethane	12	U
71-43-2	Benzene	12	U
10061-02-6	Trans-1,3-Dichloropropene	12	U
75-25-2	Bromoform	12	U
108-10-1	4-Methyl-2-Pentanone	24	U
591-78-6	2-Hexanone	24	U
127-18-4	Tetrachloroethene	12	U
79-34-5	1,1,2,2-Tetrachloroethane	12	UJ
108-88-3	Toluene	12	U
108-90-7	Chlorobenzene	12	U
100-41-4	Ethylbenzene	12	U
100-42-5	Styrene	12	U
1330-20-7	Xylene (total)	12	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR85

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY05

Sample wt/vol: 2.5 (g/mL) G Lab File ID: VOCXY05A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 16 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 76-13-1	ETHANE, 1,1,2-TRICHLORO-1,2,	3.70	24	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR86

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY06

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY06A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 19 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	18	B UJ
67-64-1	Acetone	12	UJ
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	UJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	UJ
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR86

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY06

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY06A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 19 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 76-13-1	ETHANE, 1,1,2-TRICHLORO-1,2,	3.68	12	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR87

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY07

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY07A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 23 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl Chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene Chloride	18	BuJ
67-64-1	Acetone	13	UJ
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	13	UJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	13	UJ
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	13	U
591-78-6	2-Hexanone	13	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR87

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY07

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY07A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 23 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 2 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	76-13-1	ETHANE, 1,1,2-TRICHLORO-1,2,	3.70	30	J
2.	75-69-4	METHANE, TRICHLOROFLUORO-	3.07	19	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR88

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY08

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY08A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 18 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	21	B uJ
67-64-1	Acetone	12	U J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U J
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U J
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U J
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR88

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY08

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY08A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 18 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 354-58-5	ETHANE, 1,1,1-TRICHLORO-2,2,	3.70	19	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR89

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY09

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY09A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 19 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	22	BuJ
67-64-1	Acetone	4	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	5 4	BJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	UJ
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR89

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY09

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY09A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 19 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 1 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	76-13-1	ETHANE, 1,1,2-TRICHLORO-1,2,	3.70	14	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR90

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY10

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY10A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 20 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	32	BuJ
67-64-1	Acetone	9	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	140	
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	UJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	9	
108-05-4	Vinyl Acetate	12	UJ
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR90

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY10

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY10A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 20 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	75-43-4	METHANE,DICHLOROFLUORO-	2.82	10	J
2.	75-69-4	METHANE, TRICHLOROFLUORO-	3.07	98	J
3.	76-13-1	ETHANE, 1,1,2-TRICHLORO-1,2,	3.70	18	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR91

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY11

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY11A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 13 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	21	B UJ
67-64-1	Acetone	4	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	UJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	UJ
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	11	
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

000195

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR91

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY11

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY11A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 13 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 76-13-1	ETHANE, 1,1,2-TRICHLORO-1,2,	3.70	19	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR92

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY12

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY12A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 16 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	26	B WJ
67-64-1	Acetone	2	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	UJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	UJ
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	UJ
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR92

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY12

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY12A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 16 Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	75-69-4	METHANE, TRICHLOROFLUORO-	3.05	7.1	J
2.	76-13-1	ETHANE, 1,1,2-TRICHLORO-1-2,	3.70	17	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR93

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY13

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY13A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 19 Date Analyzed: 11/16/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	31	B UJ
67-64-1	Acetone	5	UBJ
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U J
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U J
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U J
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U J
108-10-1	4-Methyl-2-Pentanone	12	U J
591-78-6	2-Hexanone	12	U J
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U J
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EFR93

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY13

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY13A

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 19 Date Analyzed: 11/16/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKL1

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: VBLKL1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: DVB111589A

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	20	
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKL1

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: VBLKL1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: DVB111589A

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 11/15/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKL2

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: VBLKL2

Sample wt/vol: 5.0 (g/mL) G Lab File ID: DVB111689A

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 11/16/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	4	J
67-64-1	Acetone	2	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	3	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKL2

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: VBLKL2

Sample wt/vol: 5.0 (g/mL) G Lab File ID: DVB111689A

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 11/16/89

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR84MS

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY04MS

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY04AMS

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 15 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	29	B
67-64-1	Acetone	16	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	22	B
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFR84MSD

Lab Name: G S E L I Contract: 68-D9-0038

Lab Code: GULF Case No.: 13099 SAS No.: _____ SDG No.: EFR81

Matrix: (soil/water) SOIL Lab Sample ID: CXY04MSD

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VOCXY04AMSD

Level: (low/med) LOW Date Received: 11/08/89

% Moisture: not dec. 15 Date Analyzed: 11/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	34	B
67-64-1	Acetone	18	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	22	B
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

GULF SOUTH ENVIRONMENTAL LABORATORY
formerly GSRI

Traffic Report

Case 13099

Post Office Box 26518 • New Orleans, Louisiana 70186 • Phone (504)283-4223 • Fax (504)288-3625

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Organic Traffic Report
(For CLP Use Only)

Case Number: 13099 | SAS No. (if applicable):

1. Sample Description (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Rinsate
   5. Soil/Sediment
   6. Oil (SAS)
   7. Waste (SAS)
   8. Other (SAS) (Specify)

2. Region Number: IV | Sampling Co.: VERSAR

4. Date Shipped: 11/7/89 | Airbill Number: 4664353024

5. Date Received: 11/8/89 | Received by: Carol Dominick

Sampler (Name): JOHN ANGSTMANN

Carrier: FEDERAL EXPRESS

Laboratory Contract Number: 68-09-0038 | Unit Price: 937.00

3. Ship To: CINDY PLAZZO AT; GULFSOUTH ENVR. LABS
6801 PRESS DR.
EAST BUILDING
NEW ORLEANS LA.
70126

Triple volume required for matrix spike/duplicate aqueous sample.

Ship medium and high concentration samples in paint cans.

See reverse for additional instructions.

6. Transfer to | Date Received

Received by

Contract Number | Price

CLP Sample Number (From labels)	(A) Sample Description (From box 1)	(B) Concentration L=low M=med H=high	(C) RAS Analysis VOA	BNA	Pest/ PCB	(D) Special Handling	(E) Station Location	(F) Date/Time of Sample Collection	(G) Corresponding CLP Inorganic Sample Number	(H) Sample Condition on Receipt	(I) High Conc. Phases (Check below) Solid	Water—MIS Liq.	Non Water—MIS Liq.
EFR 81	5	L	X				1	11/6/89 0930	MEEZ 91				
EFR 82	5	L	X				2	11/6/89 1030	MEEZ 72				
EFR 83	5	L	X				3	11/6/89 1200	MEEZ 73				
EFR 84	5	L	X				4	11/6/89 1245	MEEZ 74				
EFR 85	5	L	X				5	11/6/89 1500	MEEZ 75				
EFR 86	5	L	X				6	11/6/89 1600	MEEZ 76				
EFR 87	5	L	X				7	11/6/89 1700	MEEZ 77				
EFR 88	5	L	X				8	11/7/89 0900	MEEZ 78				
EFR 89	5	L	X				9	11/7/89 0930	MEEZ 79				
EFR 90	5	L	X				10	11/7/89 1030	MEEZ 80				
EFR 91	5	L	X				11	11/7/89 1130	MEEZ 81				
EFR 92	5	L	X				12	11/7/89 1230	MEEZ 82				
EFR 93	5	L	X				12	11/7/89 1230	MEEZ 93				
						SDG# EFR 81							
						Final SDG# EFR 93							

PARAMETER:	YES	NO	
ICE PRESENT?	✓		
BOTTLES BROKEN?		✓	
EPA TAG PRESENT?		✓	no tags
SHIPPING SEALS?	✓		
CONTAINER SEALS?	✓		
CUSTODY FORM OK?	✓		
LABELS ACCURATE?	✓		
NOTES COMMENTS (if none)	✓		

100001

EPA Form 9110-2 (8-88) Replaces EPA Form 2075-7, which may be used. Blue - SMO Copy Pink - Region Copy White - Lab Copy for Return to SMO Yellow - Lab Copy

EXECUTIVE SUMMARY

Allied Signal utilizes an on-site well to dispose of wastewater generated at its Danville Illinois facility. The wastewater is categorized as hazardous waste because it contains low concentrations of arsenic (D004). Under EPA's proposed Hazardous Waste Injection Restrictions program, continued injection of this waste will be prohibited unless the waste meets EPA-specified treatment standards or EPA approves a petition demonstrating to a reasonable degree of certainty that the waste injection operation will be protective of human health and the environment. The proposed regulations provide that such a petition may be based on a demonstration that there will be no movement of injected fluids vertically out of the injection zone or laterally to a point of discharge or interface with an Underground Source of Drinking Water (USDW) for at least 10,000 years.

This petition demonstrates that the Allied Signal Danville Facility meets the petition requirements for continued authorized injection. The basis for this demonstration is as follows:

- Geologic Conditions are favorable for Wastewater Injection: The geologic reservoir into which wastes are injected has sufficient permeability, porosity, thickness and areal extent to accept and contain injected fluids, and the overlying aquitard layers are free of transecting, transmissive faults or fractures, and are sufficiently thick, impermeable and laterally continuous to confine the waste.

  Allied's injection well is completed into the Eminence, Potosi and upper Franconia formations, which locally are comprised of a total thickness of over 600 feet. Well injection tests demonstrate the injected wastewater is easily accepted by an approximately 70 foot thick injection interval. The favorable waste injection qualities of these formations within Illinois are widely known. In fact, locally the injection interval has

a remarkably ability to accept and retain injected waste. Accurate monitoring of the injection operation over the past 15 years verifies this fact. Since the well is a packerless completion, monitoring the annulus pressure provides a continuous indication of the bottom hole pressure. Continuous readings confirm that there has been essentially no increase in formation pressure over the life of the well operation. This indicates the formation has favorable permeability, porosity, thickness and areal extent to contain the injected waste. The lack of formation pressure increase also indicates this formation will continue to safely accept waste in the future.

A second favorable pressure-related characteristic is that this formation has a pressure gradient less than hydrostatic. This essentially means that the formation lacks a driving force (pressure) to cause upward movement of injected waste from the injection reservoir. Although such a characteristic is not essential, it is desirable, since even if a conduit for upward fluid migration existed, injected waste could not migrate upward in the absence of a driving force. This characteristic thus provides added assurance that injected wastewater will not migrate into USDWs.

Although injected wastes will be confined within the injection zone, the Prairie du Chien Group serves as an additional confining system for the injected waste. Whole core samples of this formation verify its favorable properties as a confining layer. Locally it is more than 700 feet thick and comprised of extensive areas of relatively tight, impermeable dolomite. The extensive thickness and the fact that this geologic unit is laterally continuous attests to its fine capabilities as a confining layer.

In fact, an additional confining layer exists that also separates the injected waste from the lowest USDW. The Maquoketa Group is approximately 274 feet thick in the Danville area and lies between the lowest USDW and the Prairie du Chien Group. This formation is comprised in part of dense, low-permeability shale thick enough to serve as a primary confining layer. However since aquitards within the injection zone are demonstrated in this petition to be more than adequate for waste containment, the Prairie du Chien Group, the Maquoketa shale, and other low-permeability strata present at the site simply provide added assurance that there will be no waste migration into the lowest USDW. In fact, there are approximately 2600 feet of rock separating and isolating the injection interval from the lowest USDW.

The regional geology further confirms the suitability of wastewater injection into the Eminence Potosi. The Danville Facility injects into the northeast flank of a large subsurface structure known as the Illinois Basin. This subsurface basin is oval in shape, enlogated in a north-south direction, and basically covers central and southern Illinois. The injection zone and confining layers present in the Danville area thicken and dip deeper into the subsurface toward the bottom of the basin in southern Illinois. In geologic time, the natural drift of the injection formation fluids will be to the south toward the bottom of the basin. Thus natural flow will not only maintain isolation of the injected effluent, but will also increase the depth of this material and its separation from USDWs.

- No Artificial Penetrations of the Confining Formations Exist: After an extensive search within the Area of Review of the Allied well (2.5-miles), no penetrations of the confining layers were identified. Several sources were utilized to locate pertinent information regarding artificial penetrations. This search included file searches with state

libraries, consultation with the Illinois State Geological Survey and the Indiana Department of Natural Resources, and checking with two separate commercial sources of well information.

- It can be Reliably Predicted that there will be No Migration of Hazardous Waste from the Injection Zone for as long as the Waste Remains Hazardous: Scientific models developed by E. I. du Pont de Nemours & Company were utilized to develop reasonable worst case predictions of waste movement at different points in the future. These predictions are based upon a wealth of information that exists on the injection operation. The injection well has been operated since 1972. During that time more than 40 various logs or tests were run on the well. These logs provide site specific information such as the exact injection interval and other information that characterizes the injection zone. This information, combined with core sample analyses of the injection and confining zones, has been used to fully identify the hydrogeological and geochemical conditions pertinent to this site. When appropriate, regional geologic information was obtained to supplement the site specific information. By combining geologic information with key recorded well operating information (daily pressures etc.) the predictive models were "calibrated" with 15 years of baseline information. By calibrating or validating the models for the site specific conditions at this facility, reliable predictions were made as to the possible extent of waste movement in the future.

Core samp
taken at
but injec
into Emi

Computer modeling demonstrates that the wastewater is and will continue to be safely confined. A plume model was used to generate a waste front boundary designating the outermost boundary the waste could reach for given time periods, and an upward permeation model was used to identify upward permeation within the injection zone. Based on site specific information

and conservative regional input values where appropriate, the models predict a maximum plume radius of 1.04 miles and a maximum upward permeation within the injection zone of less than two tenths of one foot over ten thousand years. Given the small extent of upward fluid movement, the thickness of the confining formations, and the separation of the injection interval from the lowest USDW, the proposed requirements for confining zone thickness and separation from the lowermost USDW are easily satisfied.

- The Injection Well is Properly Constructed: The Danville injection well is constructed to prevent the movement of fluids into or between USDWs or into unauthorized formations. In addition, the well design permits the use of appropriate testing devices and workover tools and permits continuous monitoring of the injection tube and long string casing. Although discussion of well construction is not necessary to satisfy petition requirements, this petition demonstrates that regulatory criteria for well design are surpassed. The injection well has two independent monitoring systems that permit continuous monitoring of the tubing and long string casing. In addition to the standard annulus pressure monitoring devices used on injection wells, the well is equipped with an independent electrode monitoring system that also continuously monitors the integrity of the injection tubing and long string casing. By continuously measuring the conductivity of the annular fluid, the electrode monitoring system can automatically alert well operators of potential well problems.

  In addition, the well is constructed with an extra protective casing. Typically injection wells are comprised of two strings of casing. However, the Allied Signal well is made up of three strings of casing that provide added environmental protection. Additionally. the well materials meet all compatibility requirements prescribed by EPA.

Based on a thorough review of the local and regional geology and the mechanical integrity of the well, it is demonstrated that this injection operation is properly sited and constructed. By matching existing historical operating data to E. I. du Pont de Nemours & Company models, it is demonstrated to a reasonable degree of certainty there will be no migration of hazardous waste from the injection zone for as long as the waste remains hazardous. Accordingly this well meets the requirements for continued injection of hazardous waste.

1. SITE DESCRIPTION

1.1 REGULATORY CLASSIFICATION

The Allied Signal, Inc. Danville Facility operates one Class I injection well. Historically, the total flow has been limited to 150 gallons per minute as set by a previous permit issued by the Illinois Environmental Protection Agency (IEPA).

The liquid waste is comprised of contaminated storm water, neutralized hydrochloric acid vent scrubber discharge, boiler blowdowns, cooling tower blowdowns, dilute waste caustic from a scrubber, hydrofluoric vent scrubber discharge, water softening equipment backflush, and product hydrochloric acid. With an arsenic concentration greater than 5 milligrams per liter, the waste stream is characterized as hazardous pursuant to 40 CFR 261.24 (b). The Environmental Protection Agency (EPA) Hazardous Waste Number for the arsenic is D004.

With neutralization facilities which were put into operation in January 1988, these waste waters are currently neutralized to a pH of 4 to 10 prior to injection.

1.2 SITE DESCRIPTION

Danville Works comprises approximately 80 acres and is located in Vermilion County Illinois. The plant operation occupies 16 acres which is completely surrounded by a chain link fence. Danville Works produces Genetron, a registered trademark for Allied Signal's fluorocarbon refrigerant gases. Many types of Genetron can be made. This plant produces Genetron 11 and 12. (trichlorofluoromethane and dichlorodifluoromethane). These materials are distributed from the plant via tank cars, tank trucks, cylinders, drums and jugs. Different Genetron types which have been produced at other Allied locations are received in bulk and repackaged here for distribution.

Most Genetron are inert gases and have a high vapor pressure. In the plant they are handled in a liquid state as compressed gases under pressure. Customers use them as propellant gases in various applications and in air conditioners, freezers and chillers of all kinds.

A co-product, hydrochloric acid is produced as a result of the plant process. This acid is sold as food grade acid to the food processing industry and is also used in pickling steel.

1.2.1 General Identification Data

Operator: Allied Signal, Inc.

Address: P. O. Box 13
Danville, IL 61834-0013

Telephone: (217) 446-4700

Well Identification Number: WDW-1

Authorized Agent for Petition: Don Phillips
Plant Manager
P. O. Box 13
Danville, IL 61834-0013
(217) 446-4700

Public Notice Agent: Same

Well for which Petition is Submitted: WDW-1

1.2.2 Injected Effluent

Injection of neutralized waste water containing contaminated storm water, hydrochloric acid vent scrubber discharge, boiler blowdowns, cooling tower blowdowns, dilute waste caustic from a scrubber, hydrofluoric acid vent scrubber discharge, water softening equipment backflush, and product hydrochloric acid.

1.2.3 Effluent Characteristics

Over the past several years the effluent can be described as having the following physical and chemical characteristics. With the recent (1/88) installation of the effluent neutralization system, an analytical history of the neutralized effluent has not been compiled however, with the exception of pH, neutralization is not expected to significantly alter the following characteristics:

temperature	32 - 130°F
specific gravity	< 1.20
viscosity at 100°F	.4500 - .5900 cp
suspended solids	< 500 mg/l
pH	.1 - 13.9
inorganic chlorides	< 10%
TOC	< 200 mg/l
arsenic	< 500 mg/l
nickel	< 10 mg/l
free chlorine	< 10 mg/l

1.3 WELL DATA

1.3.1 Well Location

Well Name/Number: WDW 1

County: Vermilion

Well Location (Geographic Coordinates): Latitude: 40° 07' 35"
Longitude: 87° 33' 35"

Well Location (Legal Description):

A 360 degree circular parcel of land located in Vermilion County, Illinois, having a diameter of 13 and 3/8 inches, with the center of said circular parcel being located at a point more particularly described as follows: Commencing at a point 446.19 feet North of the Southeast Corner of the Southwest Quarter of the Northwest Quarter of Section 12, Township 19 North, Range 11 West of the 2nd Principal Meridian, and on the East Line thereof; thence West, parallel with the South Line of said Southwest Quarter of the Northwest Quarter, a distance of 46.88 feet to the center of the aforesaid parcel; all being situated in Vermilion County, Illinois.

Location of the nearest town: The location of the nearest town, Danville, Illinois is one mile west of the well (see Appendix 1-1).

1.3.2 Well Completion Data

Spud Date: July 24, 1972 Completion Date: October 6, 1972

Original Total Depth Drilled: 6684 feet below ground level

Well Recompletion Date: November 27, 1973

Plugged Back Total Depth: 4011 feet below ground level

Well Status: Active

Elevation (Above Mean Sea Level):

Original Kelly Bushing (KB)	661.8 feet
Original Ground Level (GL)	647.8 feet
Original Drill Floor (DF)	660.8 feet
Original KB to GL	14.0 feet

Name and Depth of Injection Zone:

Eminence Formation	3,332 - 3,620 feet below KB
Potosi Formation	3,620 - 3,928 feet below KB
Upper Franconia Formation	3,928 - 4,012 feet below KB
Davis Formation	4,012 - 4,100 feet below KB

3.3.1.4 Maquoketa Group

The Maquoketa Group is composed of 274 feet of argillaceous limestone and a low permeability shale. The top of the Maquoketa shale is at approximately 1700 feet, over 700 feet below the lowest USDW. Even if the Prairie du Chien confining layer did not exist a variety of permeable layers between the Maquoketa shale and the injection zone would disperse the waste and/or pressure. With its low permeability, the Maquoketa essentially acts as a second confining zone for the Eminence-Potosi injection reservoir.

3.3.1.5 Shallow Aquifers

The Pennsylvania System is locally composed of mostly dark shales with some gravels and fine sand. The Mississippian System, Knobstone Formation is locally composed mostly of sandstone with layers of shale, limestone and dolomite. The St. Peter Formation is composed of sandstone with some limestone and shale.

The quality of the groundwater is determined to a great extent by the characteristics of the aquifer and source areas. The chemical character of the potable groundwater in shallow glacial drift aquifers in the Danville area is described as hard, alkaline, high in total dissolved solids and contains objectionable amounts of iron [28]. The quality of the groundwater in the formations underlying the glacial drift is relatively unknown. From well logs taken in a well approximately 3 miles northwest of the plant (Section 21, T20N, R11W), the water at 350 feet contained approximately 5000 ppm TDS and the water at 600 feet contained approximately 8000 ppm TDS. Drill stem tests conducted during the drilling of the Allied Signal, Inc. Waste Well 1 indicated that the St. Peter sandstone contained 14,900 ppm TDS at 2485 - 2620 feet. Based on this, the lowest USDW, containing 10,000 ppm TDS, is estimated to be 1000 feet below the land surface. A potentiometric surface map of the uppermost aquifer is provided in Appendix 3-5.

how about lowermost

- The remaining acid which has not been fully neutralized by reaction will be pushed into a region where neutralization will occur.

- The extreme waste front will eventually consist of neutralized waste.

- CO_2 that was not dissolved will have a medium for dissolution.

As the reagents in the vicinity of the borehole are depleted over time, acid must travel further to be neutralized. This will cause some dilution, as described above, and will place the point of any potential evolved CO_2 further from the wellbore. In turn, for the CO_2 to cause a well blow out it would have to migrate through fluid in which it would be absorbed if dilute acid, neutralized effluent, or a basic fluid were present.

While prolonged injection of concentrated acid could create a potential well blow out, periodic injection of concentrated acid followed by periods of injection of dilute or basic material averaging less than 6% acid should be considered safe.

Waste Well 1 at Danville Works has been used for injection of dilute HCl for 15 years. Therefore, the point of contact between the waste acid and "virgin" dolomite is further away from the immediate wellbore area allowing for reabsorption of any free CO_2. Based on plant operation, prolonged injection of concentrated HCl did not occur and the possibility of a blow out is non existent.

6.1.2 Neutralized Effluent in a Carbonate Formation

The primary compatibility problem when injecting a neutral waste stream into a subsurface injection zone is due to plugging of the formation by suspended solids in the waste stream or by precipitates formed by a reaction between the injected fluid and the injection zone formation fluid. This represents only an operational concern, however, and does not raise any environmental issues.

Removal of suspended solids above a minimum size can be helpful in preventing large particles from plugging the injection interval. Typically, it is unnecessary to filter small-sized solids (less than 60 microns) when injecting into vugular formations, such as the Eminence and Potosi Formations, due to their interconnected openings and void spaces [2].

The major reactions which could potentially cause pluggage problems via precipitation formation are [3]:

- o Alkaline earth precipitates - The alkaline earth metals, calcium, barium, and strontium all have relatively insoluble carbonates, sulfates, phosphates and fluorides. Prevalence of these alkaline earth metal ions in formation brine can cause incompatibility with carbonate-, sulfate-, phosphate-, or sulfate-bearing waste streams. There were no traces of any alkaline earth metals in the formation except barium at the concentration of 1.0 mg/l. Therefore no alkaline earth precipitates are expected.

- o Heavy metal precipitates - Heavy metals, including aluminum, manganese, chromium, nickel, cadmium, zinc, copper, and iron are prone to cause plugging. The hydroxides, sulfides, and carbonates of these metals are relatively insoluble. The formation fluid contains no aluminum, manganese, copper, chromium, nickel, and cadmium, and significant amounts of iron and zinc (see Section 6.3). The injection fluid contains insignificant amounts of iron and nickel, therefore no plugging problems associated with heavy metal precipitates are expected.

- o Oxidation - reduction precipitates - These are usually the result of a reaction of hydrogen sulfide with an injection fluid oxidizing agent. Typically this is caused by the reduction of chromates or dichromates in cooling water to chromic hydroxide. Oxidation - reduction precipitates are not

expected to be a problem due to a lack of strong oxidizing agents in the waste fluid.

- Organic Polymers - Some processes produce liquid organic polymers which became resin-like at formation pressure and temperature. This waste stream contains no organic polymers.

Barnes studied the thermodynamic water-mineral reaction due to injection of fluids into natural systems based on predictions of precipitation and solution reactions of known systems [4]. Departures from stable equilibrium due to a situation with above minimum Gibbs free energy, can be used to predict whether a mineral will dissolve or a precipitate will be formed due to injection of a non-formation fluid into a reservoir. In general, injection fluids were found to precipitate in natural systems where the Gibbs free energy was less than 1 kcal or less. From known natural systems, Dolomite has a Gibbs free energy precipitate potential of 3 kcal. Therefore, no precipitate is predicted due to injection fluid-host rock thermodynamic reactions.

In a heavily studied case of injection of neutralized waste (pH - 5.5) into saline carbonate aquifers in Florida, there were no apparent compatibility problems between the injection fluid, the injection formation and the injection zone formation fluid [5, 6, 7].

In conclusion, there is no evidence that injection of neutralized waste fluid into formations like the Eminence and Potosi Formations will in any way compromise the injectivity in the injection zone or the ability of the formations to keep the waste contained.

6.2 WELL MATERIALS COMPATIBILITY

Consideration of compatibility assures that the materials in the well are compatible with the fluids with which they will come into contact. Properly selected materials of construction will minimize corrosion, reduce maintenance and repairs, provide for smooth well operations and ensure a sound well design which will operate safely and provide protection of the environment.

6.2.1 Waste Stream

All components of the injection well which come in contact with the waste stream are made of corrosion resistant materials. Prior to January 1988 the waste stream was used to inject dilute hydrochloric acid. Accordingly the well was built and designed to inject corrosive waste water. The materials of construction used meet or exceed the standards developed for such wastes by the American Institute and American Society for Testing Materials. Successful well operation since 1973 confirms that the well is properly constructed.

In January 1988, the installation of a surface waste water neutralization facility was completed. With that, the waste water will be neutralized to a pH of 4-10. This eliminates any previous corrosivity concerns. The neutralized effluent is assuredly fully compatible with all applicable well components.

Appendix 4-2

WATER WELLS WITHIN A 2.5-MILE RADIUS OF VERMILION, ILLINOIS

Map ID. No.	Location	Owner	Well Depth	Date Drilled
01	34-20N-11W	Bert Howell	199'	1964
02	35-20N-11W	Bruce Davis	220'	03-06-79
03	10-19N-11W	Vermilion County Hwy Dept.	42'	12-20-79
04	11-19N-11W	Michael Stonebraker	99'	09-22-83
05	11-19N-11W	Harold Carter	260'	07-10-79
06	14-19N-11W	Bernard Stultz	71'	1976
07	15-19N-11W	Danville Gardens	114'	08-12-77
08	15-19N-11W	Don Van Burren	112'	12-07-76
09	15-19N-11W	Richardson and Hegelar	110'	06-18-71
10	15-19N-11W	Richardson Const. Co.	76'	08-30-70
11	15-19N-11W	Greer Salvage	57'	1964
12	15-19N-11W	John Rouse	88'	06-08-69
13	15-19N-11W	Phill Rouse	105'	09-11-79
14	15-19N-11W	Phill Rouse	100'	06-25-79
15	15-19N-11W	Lynch District Fire Dept.	215'	12-13-73
16	16-19N-11W	C. C. Camp Vermillion	585'	1939
17	23-19N-11W	Madeline McMillion	185'	07-20-82
18	23-19N-11W	Ronald Boulson	61'	08-23-78
19	23-19N-11W	Loyd Wiesemann	120'	11-06-74
20	23-19N-11W	Frank Richter	235'	08-28-74
21	23-19N-11W	Charles Smith	45'	07-25-85
22	23-19N-11W	Howard Taylor	41'	07-10-85
23	24-19N-11W	Dave Capas	89'	12-16-80
24	24-19N-11W	Paul V. Thomas	201'	09-22-76
25	24-19N-11W	Paul V. Thomas	176'	09-22-76
26	24-19N-11W	Larry Hillary	40'	06-29-82

Map ID. No.	Location	Owner	Well Depth	Date Drilled
27	24-19N-11W	Gibson Federal	184'	11-06-81
28	24-19N-11W	Walter Schackmann	47'	07-20-84
29	14-19N-11W	Mrs. John Pose	100'	10-20-77
30	17-19N-11W	Steve Trosper	54'	05-16-78
31	05-19N-11W	George Simon	154'	07-24-78
32	05-19N-11W	Ivan Ross	173'	09-30-61
33	01-19N-1W	Elmer Engelman	65'	1948
34	11-19N-11W	Wesley Kaiser	110'	1966
35	11-11N-11W	Wesley Kaiser	Unknown	Unknown

In addition to the above water wells, Allied Signal, Inc. Danville Facility has 6 recovery wells and 51 monitor wells, all less than 25 feet deep.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: MAR 1 3 1989

SUBJECT: Memorandum of Understanding With the Water Division

FROM: David A. Ullrich, Associate Division Director
Office of RCRA, Waste Management Division

TO: All RCRA Staff

Attached is a copy of a Memorandum of Understanding (MOU) with the Water Division, which clearly defines our working relationship with them. Please review it carefully so you understand how we expect to coordinate our efforts to bring about better environmental protection and overall results in our respective programs.

As the issues we face become more complex and more interrelated, more effective working relationships with the other divisions are much more important. This MOU should help us to work better together.

My thanks to the RCRA team which worked on this. Bernie Orenstein was in the lead, with help from Betsy Nolte, Greg Carlson and Richard Traub.

Attachment

cc: F. Covington
B. Constantelos
M. Gade
D. Bryson
C. Sutfin
M. Smith
B. Frey

4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: FEB 24 1989

SUBJECT: Final WD/OR MOU

FROM: Charles H. Sutfin
Director, Water Division

TO: Basil G. Constantelos
Director, Waste Management Division

David A. Ullrich
Associate Division Director,
Office of RCRA

Attached for your review and signature is the final WD/OR MOU that was developed by a work group consisting of WD and OR staff. The MOU reflects the concerns of both the Water and Waste Management Division programs. This final version contains more explanations concerning why certain activities are included in the MOU, and what each division is expected to do with the information being exchanged. (A second copy of the MOU is attached for your reference which has the additional language underlined).

If you have any questions, please call Jerri-Anne Garl, Chief, Office of Ground Water, at 886-1490.

cc: D. Bryson
J. Garl

WD/OR Work Group (will be cc'd on the signed copy):

C. Saada	B. Orenstein
T. Henry	B. Nolte
A. Moretta	R. Traub
S. Bouchard	R. Carlson

FINAL
2/8/89

Memorandum of Understanding Between the Water Division and the Office of RCRA, Waste Management Division

I. INTRODUCTION

This Memorandum of Understanding (MOU) establishes the critical points of coordination between the Water Division (WD) and the Office of RCRA (OR). The WD is responsible for the management and implementation of programs authorized under the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). The CWA programs include: Ground Water, Nonpoint Source (NPS), Wetlands, National Pollutant Discharge Elimination System (NPDES) permits, and Construction Grants. The SDWA programs include: Underground Injection Control (UIC), Public Water Supply (PWS), Sole Source Aquifer (SSA) and Wellhead Protection (WHP). The OR manages and implements the Resource Conservation and Recovery Act (RCRA) which includes the Hazardous Waste Management program and the Underground Storage Tank (UST) program.

There are many activities and responsibilities in both WD and OR which affect either surface, ground or drinking water quality and are interdivisional in nature. Decisions in OR can have a major impact on water quality and public water supplies. Conversely, decisions on issues such as drinking water limits or underground injection practices may impact hazardous waste program determinations. The WD and OR have specific responsibilities which can be enhanced by a proper and timely level of coordination between programs. One method of fostering effective coordination is to conduct cross-training sessions for program inspectors, so that they are aware of other program compliance issues. Each division would be responsible for holding basic training and periodic updates on new program developments. The overall goal of this MOU is to create an open forum for the identification and resolution of ground and surface water contamination problems.

II. AREAS OF COORDINATION

To assure that mandated program activities and functions are coordinated and mutually supportive, and in order to adequately protect drinking water, ground water, and surface water, the WD and OR agree to the following:

WATER DIVISION

A. UIC Section

1. UIC will provide an inventory of Class I hazardous waste injection wells to the RCRA Permitting Branch (RPB). This inventory will be updated as changes occur. This information will allow the RCRA program to update the list of Land Disposal Facilities (LDFs), as well as anticipate the future need for

providing the UIC program with enforcement capability and support. Facilities will be identified by their name, location, well identification number, well operational status, date of UIC permit issuance (where applicable), and waste type. The initial inventory and subsequent updates will be transmitted via memo from the Safe Drinking Water Branch (SDWB) Chief to the RPB Chief.

2. The UIC Section Chief will notify the RPB Chief via memo when new applications for proposed Class I hazardous waste wells are received. The applications will be made available to RPB upon written request to the UIC Section Chief or his designee. Information regarding applications and copies of the actual documents will be obtained from the State agencies in primacy states. RPB will provide comments to UIC, as appropriate.

3. UIC will provide a quarterly inspection schedule for Class I hazardous waste injection wells upon request by the RCRA Enforcement Branch (REB). This schedule could be used for arranging joint UIC/OR inspections. If requested by REB these lists will be provided automatically every quarter. For primacy states, state agency inspection schedules will be requested when needed by REB.

4. UIC will advise the appropriate RCRA enforcement agency via memo from the UIC Section Chief to the REB Chief (REB or State agency) of any proposed compliance/enforcement actions at RCRA sites for violations involving injection of hazardous wastes or of cases where there is a ground water contamination problem resulting from hazardous waste injection activities. This information will be used when assessing the need for corrective action at RCRA sites. UIC will also provide REB with quarterly noncompliance reports on Class I hazardous waste wells at RCRA sites upon written request from the REB Chief. If requested in writing by the REB Chief, UIC will provide the quarterly reports automatically every quarter. For primacy states, information on state enforcement actions will be provided by the state agencies.

5. UIC and REB will share information concerning formal enforcement activities at facilities jointly regulated by UIC and REB. When appropriate, UIC and REB will coordinate Federal enforcement actions. Initial requests for information and/or assistance shall be made in writing. A response to the initial request will be made in writing within 30 days. Subsequent communications may be on a more informal basis. For primacy states, information on state enforcement actions will be provided by the state agencies.

6. When injection wells are used to reinject treated contaminated ground water into the same formation from which it was drawn in accordance with an action approved by the Environmental Protection Agency (EPA) pursuant to provisions under RCRA, RPB will request UIC to review and comment on the injection

proposal and operation plan. The operation plan should account for the duration of operation and the party responsible for operation oversight. UIC will review the operational and plugging plan and provide any written comments within 15 days.

7. UIC will advise REB in writing via a memo from the UIC Section Chief to the REB Chief within 30 days of any permitted waste stream changes involving Class I hazardous waste wells at RCRA facilities, so that RCRA can track additional waste streams added to other RCRA units. For primacy states, information regarding waste stream changes will be provided by the state agencies.

8. The UIC Section Chief may request in writing to the REB Chief that REB make a determination of whether a particular injection waste stream is hazardous. Upon receiving all the information necessary to make a determination from UIC, REB will provide a determination within 15 days of such request unless further clarification is necessary. This assistance will be limited to an administrative review and will not include laboratory support.

9. Within 10 days of land disposal restriction proposed/final determinations (land ban petition determinations) reached for Class I wells injecting hazardous wastes, the WD Director will inform the OR Director in writing via memo.

10. UIC will provide technical support to REB in enforcing the land ban requirements, and will notify REB within 10 days of the operator's applicable land ban deadline if REB needs to take enforcement action against the owner/operator.

B. Water Quality Branch (WQB)

1. WQB will serve as the lead for the RCRA permit-by-rule regulation of publicly owned treatment works (POTWs) which accept hazardous wastes by truck, rail, or dedicated pipe. WQB responsibilities as identified in the November 19, 1987 permit-by-rule workplan include: identification of POTWs that accept hazardous waste; notification of POTWs of the RCRA permit-by-rule requirements; permit-by-rule compliance assessment, inspections and enforcement; issuance of corrective action RIDER permits. WQB will consult with RPB and seek technical advice as appropriate on issues of permit issuance and inspections prior to implementing any formal permit-by-rule enforcement actions.

2. WQB will provide RPB with information regarding pretreatment regulations that affect the discharge of hazardous wastes to POTWs (e.g., regulations pursuant to RCRA 301(b), the Domestic Sewage Study). WQB will implement the regulations and RPB will ensure that RCRA activities, such as corrective actions, are conducted in compliance with the regulations.

3. WQB will provide to RPB, when available, lists of degraded waters, developed by the states pursuant to section 304(l) of the Clean Water Act, which may require special controls to improve water quality. WQB will identify special requirements for such waters for use in corrective action or alternative concentration limits decisions.

4. WQB will provide a quarterly listing of planned NPDES inspections to REB, which may be used by REB in planning RCRA inspections or in coordinating inspections at high priority facilities.

5. At the beginning of each fiscal year, WQB will provide to RPB a yearly listing and schedule of NPDES permits scheduled for reissuance in the upcoming year. RPB may factor this information into its own permitting efforts, and/or provide facility information to WQB for use in WQB permit reviews.

6. WQB will provide reviews of materials submitted by RPB within the requested time frame, not to be less than 15 working days unless prior agreement to a shorter period is made by the Chief, WQB, or his designee.

7. WQB will coordinate with RPB, OUST, and the States to ensure timely issuance of NPDES permits for aquifer related discharges to surface waters. Such discharges include those from ground water pump and treat systems, and those instances where contaminated ground water plumes are intercepted directly by surface waters.

8. WQB will serve as the lead contact on matters relating to the technical nature and requirements of municipal sludge generation and disposal. WQB will notify RPB where a municipal facility is suspected of generating and/or disposing of a hazardous waste which is regulated under RCRA within 15 days of receiving such information.

9. WQB will serve as the lead for approving State sludge programs and negotiating State interim phase sludge permitting agreements as appropriate sludge regulations and guidances become promulgated and finalized, respectively.

C. Office of Ground Water (OGW)

1. OGW will provide the Associate Director of OR with boundary areas of designated Sole Source Aquifers (SSAs), the Federal requirements associated with such designations, and provide periodic updates as new designations are made. In addition, pertinent documents regarding individual SSA designations, the supporting hydrologic documents, and notification of any other supplementary reports will be transmitted. OR will take areas of SSA designation into account when prioritizing permitting, inspection, and enforcement activities.

2. OGW will provide the Associate Director of OR with the boundary areas of designated Wellhead Protection Areas (WHPAs), the state requirements associated with such designations, and provide periodic updates as new designations are made. Pertinent documents regarding individual WHPAs will also be transmitted. OR will take designated WHPAs into account when prioritizing permitting, inspection, and enforcement activities.

3. OGW will provide RPB with all regulations and guidance pertaining to ground water as they are issued, particularly concerning the Wellhead Protection Program and the Guidelines for Ground Water Classification.

4. OGW will participate, upon request from the Associate Division Director of OR, in peer reviews of RCRA corrective actions which impact ground water as resources permit. OGW will provide, upon request, available geologic/hydrologic information. RPB will provide OGW at least 15 working days to review any submission, unless prior agreement on a shorter time frame is reached with the Chief, OGW, or her designee.

5. OGW will provide to the Associate Division Director of OR, if available, maps indicating areas of ground water contamination vulnerability, and Regional areas of concern. OR will take areas of ground water contamination vulnerability into account when prioritizing permitting, inspection, and enforcement activities.

6. OGW will review, upon request, and as resources permit, UST corrective action plans in WHPAs, SSAs, or vulnerable ground water areas as they pertain to treatment technology and appropriate cleanup levels. OUST will provide at least 15 working days to review any submission, unless prior agreement on a shorter time frame is reached with the Chief, OGW, or her designee.

D. Drinking Water Section (DWS)

1. DWS will, upon request from OR, provide drinking water health advisory support in evaluation of threats to water supply sources from immediate and potential releases as resources permit.

2. Upon notification from RPB, DWS will provide to the Associate Division Director of OR, the appropriate state contacts who can supply available information concerning public water supplies which might be affected by a proposed hazardous waste site. This includes information on public water system facilities (source locations, population served, water treatment processes, water supply monitoring and alternate water supply sources).

3. DWS will communicate all drinking water standards and policies on risk to the OR Regional Health Effects Expert. Further, DWS will assist RPB in communicating risk to consumers and operators of public water systems in situations where such communication becomes necessary.

4. Where appropriate, DWS will serve as initial contact to the State water supply agencies on matters involving significant UST and RPB activities that affect public drinking water supplies.

5. DWS will participate upon request, in RCRA permit application technical reviews, as resources permit. DWS will provide, if available, information on the location of wells within the area of influence, contaminant toxicity information, water treatment technology, and when needed, information on alternate sources of drinking water. RPB will provide DWS at least 15 working days to review any submission, unless prior agreement on a shorter time frame is reached with the Chief, DWS, or his designee.

OFFICE OF RCRA

E. OR Immediate Office

1. OR will notify UIC in writing of its determination regarding corrective actions at Class I hazardous waste facilities in UIC primacy States (Illinois and Ohio). Where corrective actions include the well or waste injected into the well, RPB will request that UIC review and comment on the proposed corrective action plan as it concerns the well or the injected waste. RPB will provide UIC at least 15 working days to review the plan, unless prior agreement on a shorter time frame is reached with the Chief, UIC, or his designee.

F. RCRA Permitting Branch (RPB)

1. RPB will notify UIC in writing of any injection well interim status discrepancies within 10 days of receiving the Class I hazardous waste well inventory.

2. RPB will notify UIC in writing within 10 days when an EPA approved remedial ground water action includes the reinjection of treated ground water into the same formation from which it was drawn. RPB will allow UIC 15 days to review the injection proposal and operation and plugging plan, and provide written comments to RPB.

3. Upon request, RPB will provide ground water monitoring data for hazardous waste facilities with injection wells to the UIC Section Chief within 30 days of its receipt. The UIC Section Chief will provide the REB Chief with a list of Class I facilities.

4. RPB will notify the UIC Section Chief within 10 days of receipt of RCRA permit applications for facilities which may require permits for underground injection of wastes.

5. RPB will provide technical assistance, as necessary, to WQB for POTWs requiring a RCRA permit-by-rule.

6. RPB will notify WQB immediately when it receives information that a contaminated ground water plume is being intercepted by, and is discharging in whole or in part to, surface water. The NPDES permit for such a discharge will define the allowable pollutant concentrations and loading rate from the ground water discharge. Similarly, the RPB will ensure that all ground water pump and treat systems discharging into surface waters are permitted under NPDES prior to initiating discharge.

7. RPB will assist WQB in the review of those sections of proposed state sludge programs dealing with sludge use/disposal options which fall under the requirements of RCRA. The details of the review will be dependent on the sludge management regulations after promulgation. WQB will provide RPB with at least 15 working days to review the plan, unless prior agreement on a shorter time frame is reached with the Chief, RPB, or his designee.

8. RPB will provide OGW the opportunity to review and comment on proposed ACL decisions at RCRA sites. OGW will review the decisions with respect to SSAs, WHPAs, and ground waters vulnerable to contamination. RPB will provide OGW at least 15 working days to review the materials, unless prior agreement on a shorter time frame is reached with the Chief, OGW, or her designee.

9. RPB will contact OGW regarding any proposed waiver of RCRA liner requirements for a facility if the waiver request is based on the contention that no public water supplies or underground sources of drinking water exist near the facility or that ground water is not vulnerable to contamination. RPB will provide OGW with the opportunity to review and comment on any proposed waivers of this type. RPB will provide OGW at least 15 working days to review the plan, unless prior agreement on a shorter time frame is reached with the Chief, OGW, or her designee.

10. RPB, in coordination with other OR branches, will provide OGW with location information (latitude/longitude) on RCRA facilities potentially impacting surface water bodies, public water supplies, and clusters of residential well users. OGW will use this information to identify areas with clusters of contaminant sources. Regional initiatives can then be focused on these areas.

11. RPB will consider Office of Drinking Water Health Advisories for all risk assessments and risk communication efforts, as appropriate.

12. RPB will notify the DWS of the location of proposed hazardous waste sites. DWS will then provide to the Associate Division Director of OR the appropriate state contacts who can supply available information concerning public water supplies that might be affected by the proposed sites.

G. RCRA Enforcement Branch (REB)

1. For RCRA facilities with hazardous waste injection wells, REB will provide UIC with state quarterly inspection schedules as requested by UIC. This schedule could be used for arranging joint UIC/OR inspections. Any schedule revisions will be communicated to UIC as soon as possible. REB will also advise UIC of any unusual items or changes of waste stream noted during inspections which could require UIC actions, and provide UIC with the results of these inspections in these instances within 30 days.

2. During RCRA site inspections (either by EPA, State, or contractor) if any injection wells are discovered at a facility, REB will notify the UIC Section as to the name and location of the site. The UIC inventory can thus be continuously updated.

3. REB and UIC will share information concerning enforcement activities (e.g., noncompliance letters, administrative orders, inspections, criminal investigations) at facilities jointly regulated by REB and UIC. Initial requests for information and/or assistance shall be made in writing. A response to the initial request will be made in writing within 30 days. Subsequent communications can be through telephone conversations, personal conversation, or during formal meetings. When appropriate, REB and UIC will coordinate Federal enforcement actions.

4. At the beginning of each fiscal year, REB will provide WQB with a quarterly listing of planned RCRA inspections, which may be used by WQB in planning NPDES inspections or in coordinating inspections with REB at high priority facilities.

5. REB will provide contaminant information to DWS when a RCRA facility's interim status or permit violation potentially affects sources of drinking water. REB will notify DWS when a compliance/enforcement activity involves contamination of drinking water supply.

H. Office of Underground Storage Tanks (OUST)

1. OUST will require state Underground Storage Tank/LUST Trust Fund (UST/LTF) programs, through UST/LTF Cooperative Agreements (CAs), to coordinate with the state UIC programs in Illinois, Ohio, and Wisconsin to the extent possible on corrective actions. OUST shall function as a clearinghouse for state contacts by providing them with UIC contacts and information (to be supplied by UIC).

OUST will require State UST/LTF Programs in Indiana, Minnesota, and Michigan, through State UST/LTF Cooperative Agreements, to provide OUST with well inventory information (see 40 CFR 144.52) when LUST corrective actions involve underground injections. OUST will subsequently transfer the information to the Water Division- UIC Section along with the name of a UST/LTF State contact.

2. OUST will require state UST/LTF programs, through UST/LTF CAs, to coordinate state agency or responsible party corrective actions to the extent possible with the state NPDES program, and the state wellhead protection program.

3. OUST will require state UST/LTF programs, through UST/LTF CAs, to coordinate state agency or responsible party corrective actions to the extent possible with the state public water supply (PWS) program.

Agreed to:

Charles H. Sutfin, Director
Water Division

2/24/89
Date

Basil G. Constantelos, Director
Waste Management Division

3/9/89
Date

David A. Ullrich, Associate
Division Director, Office of RCRA

3/9/89
Date

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

RFA

DATE: 10/~~23~~25/89

SUBJECT: SAS Requests for Allied-Signal, Danville, Illinois

(RCRA)

FROM: JAN PELS

contact: Judy Kleinman
tel. #: 312-886-1482

TO: LOREN MINNICH

Enclosed is a summary of the SAS Requests for the week of 11/6/89.

The following are generic Region V SAS's:

1. Analysis of fluoride in soil (S/010)

SAS requests for Sulfate in Soil and Chloride in soil are enclosed. Also, a SAS request for Determination of % solids in soils is presented.

Note: The samples will be collected the week of 11/6/89 and held until a lab has been located.

Please phone with any questions.

EPA FORM 1320-6 (REV. 3-76)

RCRA

Check here if Revised ☐

SAS SCHEDULE FOR Allied-Signal (site name) Danville, Illinois CITY/STATE RFA TYPE OF ACTIVITY/SSID

ANALYTES

WEEK OF SAMPLING/ SAMPLE MATRIX	Chloride	Fluoride Generic (S/010)	Sulfate	% Solids in Soils								
Soil												
* 11/6/89	13	13	13	13								
* Samples will be held until a lab has been found.												
Totals: Water												
Soil	13	13	13	13								

*TOTALS LISTED HERE SHOULD MATCH THE TOTALS WRITTEN ON THE SAS REQUEST FORMS.

**THIS FORM SHOULD ACCOMPANY ALL SAS REQUEST FORMS.

Anytime there are revisions for a SAS request, either in total number of samples or in the scheduled dates, a revised copy of this form must be submitted after verbal transmission of the change to the RSCC.

Approved For Scheduling

10-24-89

U.S. Environmental Protection Agency
CLP Sample Management Office
P.O. Box 818, Alexandria, Virgina 22313
PHONE: (703)/557-2490 or FTS/557-2490

SAS Number

SPECIAL ANALYTICAL SERVICES
Client Request

☐ Regional Transmittal ☐ Telephone Request

A. EPA Region/Client: V. I.

B. RSCC Representative: Jon Pels

C. Telephone Number: 312-353-2720

D. Date of Request: 10/24/89

E. Site Name: Allied-Signal, Danville, Ill.

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delay in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. General description of analytical service requested: Determination of chloride in soil, using filtrate from soil extraction done at 5 parts water to 1 part air-dried soil. Applicable from 15 ppm to 1,000 ppm (or more) chloride in soil.

2. Definition and number of work units involved (specify whether whole samples or fractions; whether organics or inorganics; whether aqueous or soil and sediments; and whether low, medium, or high concentration):

13 low Soil

3. Purpose of analysis (specify whether Superfund (Remedial or Enforcement), RCRA, NPDES, etc.):

RCRA

10504.13

4. Estimated date(s) of collections: See Schedule

5. Estimated date(s) and method of shipment: "

6. Number of days analysis and data required after laboratory receipt of samples:

30

7. Analytical protocol required (attach copy if other than a protocol currently used in this program:

See attachment I for sample preparation, and proceed with: 1) "Standard Methods", 15th ed., Method 407B (Mercuric Nitrate Method), or 2) "Standard Methods", 15th ed., Method 407C (Potentiometric Method) for determination of chloride in filtrate. Use only method specified unless approval is obtained form CFMS, CRL prior to use of any other method.

8. Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.): For Method 407B use Part 4 a for filtrate concentration less then 100 mg/l chloride and Part 4b for filtrate concentrations greater than or equal to 100 mg/l.

For Methods 407B and C, 10g of soil must be extracted if filtrate concentrations are less than 100 mg/l. Standardize titrant daily. ~~less than 100 mg/l. Standardize titrant daily.~~

9. Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain-of Custody documentation, etc.). If not completed, format of results will be left to program discretion. Provide sample preparat logs for all filtrates. Identify test procedure used. Bench records tabulating titrant standardizations, instrument calibration, air-dried sample weights, % solids, filtrate volumes, titrant volumes, order of sample determinations will be provided with copies of worksheets used to calculate results. All records must be legible. Report results as mg/kg chloride dry weight (103-105°C) See attachment II for example calculation.

10. Other (use additional sheets or attach supplementary information, as needed):

11. Name of sampling/shipping contact: Judy Kleinman

Phone: 312/886-1482

10504.13

I. DATA REQUIREMENTS

Parameter	Detection Limit	Precision Desired (+% or Conc.)
Chloride	15 ppm (2 mg/l in filtrate)	± 20% for difference in duplicate sample results.

II. QC REQUIREMENTS

Audits Required	Frequency of Audits	Limits* (% or Conc.)
Prep blank	1 in 10 or fewer samples	<3 mg/l in filtrate
Matrix spike*/	1 in 10 or fewer samples	80-120% recovery
Lab duplicate	1 for every 10 or fewer samples	≤ 20% relative difference
1 set of EPA Mineral reference Samples 2 concentration levels.	once	85-115% recovery
Titration Blank	Done as part of titrant standardization -	

Note: It is the laboratorys responsibility to obtain EPA Mineral Reference Samples from EMSL, Cincinnati, OH.

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Call Jay Thakkar - 312884-1972

Please return this request to the Sample Management Office as soon as possible to expedite processing of your request for special analytical services. Should you have any questions or need any assistance, please call the Sample Management Office.

*Matrix spike is added to sample prior to addition of water for extraction. Matrix spike concentration must be greater than 30 % of sample concentration.

10504.13

Attachment I

Sample Preparation for Soil (Chloride and Nitrate + Nitrite)

1. Air dry sufficiently large and representative aliquot of wet soil for all required analyses. Protect from any ammonia contamination.

2. Discard stones, rocks, and extraneous twigs from sample.

3. Grind and mix all of sample so that subsequent sub-aliqout are representative, and extractions are effective.

4. Perform % solids determination on dried soil aliquot as discusses in % solids SAS.

5. For chloride or nitrate + nitrite determinations weigh 10.0 ± 0.1g and transfer to extractions vessel.

6. Any matrix spikes are added to soil prior to addition of water.

7. Add 50 mls reagent water to allow 1) sonification for 10 minutes or more, or 2) use of a wrist action shaker for 1 hour. A horn type sonicator or wrist action shaker (or equivalent) can be used. Perform extraction as indicated.

8. Filter through retentive filter paper (such as Whatman filter paper #41) into a 100 ml volumetric flask. Rinse soil 2 or 3 times and filter into flask. Dilute to 100 mls.

9. The extractions for chloride and nitrate + nitrite can be combined so long as above soil/water ratios are kept constant.

10. If nitrate + nitrite is not tested on same day as extractions, acidify eith 1 ml/l H_2SO_4 to pH <2 until analyses. The shelflife of the filtrate is not critical for chloride.

11. Perform nitrate + nitrite and/or chloride analysis on filtrate. Report chloride or nitrate + nitrite nitrogen as ppm based on micrograms extracted per sample weight (grams), on a dry weight basis (103-105°C).

Attachment II

A representative calculation of chloride is provided.

$$\text{ppm Cl} = \frac{100}{\text{(Filtrate Volume used for titration (ml)}} \times \frac{(\text{mls titrant} - \text{mls blank})(0.014\text{N})(35{,}450)}{\text{weight sample (g)}}$$

U.S. Environmental Protection Agency
CLP Sample Management Office
P.O. Box 818, Alexandria, Virgina 22313
PHONE: (703)/557-2490 or FTS/557-2490

SAS Number

Approved For Scheduling
JUL 8 1988

SPECIAL ANALYTICAL SERVICES
Client Request

☐ Regional Transmittal ☐ Telephone Request

A. EPA Region/Client: V / RCRA

B. RSCC Representative: Jan Pels

C. Telephone Number: 312-353-2720

D. Date of Request: 10/24/89

E. Site Name: Allied Signal, Danville, Illinois

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delay in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. General description of analytical service requested: Determination of sulfate in soil, using filtrate from soil extraction done at 5 parts water to 1 part air-dried soil. Applicable from 25 ppm to 400 ppm (or more) sulfate in soil.

2. Definition and number of work units involved (specify whether whole samples or fractions; whether organics or inorganics; whether aqueous or soil and sediments; and whether low, medium, or high concentration):
42 Soils - Low

3. Purpose of analysis (specify whether Superfund (Remedial or Enforcement), RCRA, NPDES, etc.):
RCRA

10504.13

4. Estimated date(s) of collections: See Schedule

5. Estimated date(s) and method of shipment: See Schedule

6. Number of days analysis and data required after laboratory receipt of samples:

30

7. Analytical protocol required (attach copy if other than a protocol currently used in this program:

See attachment I for sample preparation, and proceed with
1. EPA Method 375.2 (Colorimetric Methylthmol Blue) - 1983 ed.
- Note: This method requires 0.75 mg/l SO_4 in Dilution Water (See Reagent Section 6.8).

2. Method 426C of Standard Mehtods, 16th ed. (Turbidimetric)
- Note: this last method provides for measurement of sulfate using 2 standard curves - a) 0 to 10 mg/l sulfate and b) 10 to 40 mg/l sulfate.
See attachment II for determining % solids in air-dried soils.

8. Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.): Extract holding time is not to exceed 48 hours from date of soil extraction. Extracts with absorbances or turbidities greater than that in the highest standard will be diluted and rerun. For Method 426C, 1) the reanalysis solution should contain between 20 and 40 mg/l sulfate, and 2) concentrations must be corrected for background turbidity and color per Section 5d of Method 426C using pH adjusted sample aliquots. Use only the methods specified. Calibration curves must include at least 6 points (including a zero concentration standard) for Method 375.2 and Buffer A of Method 426C.

9. Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain-of Custody documentation, etc.). If not completed, format of results will be left to program discretion. Provide sample preparatior logs for all filtrates. Identify test procedure used. Bench records tabulating instrument calibration, filtrate volumes used for analysis, order of sample determinations and QC audits will be provided with copies of worksheets used to calculate results. All records must be legible. Report results as mg/kg sulfate dry weight (103-105°C).

10. Other (use additional sheets or attach supplementary information, as needed):

11. Name of sampling/shipping contact: Judy Kleinman

Phone: 312 - 886-1482

I. DATA REQUIREMENTS

Parameter	Detection Limit	Precision Desired (+% or Conc.)
Sulfate	25 ppm (5 mg/l in filtrate)	± 20% for difference in duplicate sample results.

II. QC REQUIREMENTS

Audits Required	Frequency of Audits	Limits* (% or Conc.)
Prep. blank	1 in 10 or fewer samples	< 5 mg/l in filtrate
Matrix Spike*	1 in 10 or fewer samples	80-120 % recovery
Lab Duplicate	1 in 10 or fewer samples	≤ 20% relative diff.
For filtrate measurements:		
1. 5 or 6 point calibration curve	Once per day	
2. Calibration Verification and Blank	After every 10 filtrate measurements	90-110% recovery for cal. ver < 5 mg/l for blank
3. 1 set of EPA Mineral Reference samples (2 concentration Levels)	Once	85-115% Recovery

Note: It is the laboratorys responsibility to obtain EPA Mineral Reference Samples from EMSL, Cincinnati, OH.

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Please return this request to the Sample Management Office as soon as possible to expedite processing of your request for special analytical services. Should you have any questions or need any assistance, please call the Sample Management Office.

*Matrix spike is added to sample prior to addition of water for extraction. Matrix spike concentration must be greater than 30% of sample concentration.

Attachment I

Sample Preparation for Soil (Chloride, Nitrate + Nitrite, and Sulfate)

1. Air dry sufficiently large and representative aliquot of wet soil for all required analyses. Protect from any ammonia contamination.

2. Discard stones, rocks, and extraneous twigs from sample.

3. Grind and mix all of sample so that subsequent sub-aliquot are representative, and extractions are effective.

4. Perform % solids determination on dried soil aliquot as discussed in % solids attachments to the chloride nitrate + nitrite, and sulfate SAS's.

5. For chloride nitrate + nitrite or sulfate determinations weigh 10.0 ± 0.1g and transfer to extractions vessel.

6. Any matrix spikes are added to soil proir to addition of water.

7. Add 50 mls reagent water to allow 1) sonification for 10 minutes or more, or 2) use of a wrist action shaker for 1 hour. A horn type sonicator or wrist action shaker (or equivelent) can be used. Perform extractions as indicated.

8. Filter through retentive filter paper (such as Whatman filter paper #41) into a 100 ml volumetric flask. Rinse soil 2 or 3 times and filter into flask. Dilute to 100 mls.

9. The extractions for chloride, nitrate + nitrite and sulfate can be combined so long as above soil/water ratios are kept constant.

10. If nitrate + nitrite is not tested on same day as extractions, acidify with 1 ml/l H_2SO_4 to pH <2 until analyses. The shelflife of the filtrate is not critical for chloride. Sulfate should be tested within 48 hours of extraction.

11. Perform nitrate + nitrite, sulfate and/or chloride anlaysis on filtrate. Report chloride, sulfate, or nitrate + nitrite nitrogen as ppm based on micrograms extracted per sample weight (grams), on a dry weight basis, (103-105°C).

12. Raw data provided shall include preparation logs documenting all extractions (soil, matrix spikes, blanks, etc.). Bench records shall include chemical analysis records for filtrates. Both records shall record dates and analyst's signatures.

ALLIED

Allied Corporation
P.O. Box 13
Danville, IL 61832
Telephone (217) 446-4700

February 22, 1988

Steven D. Burton
U. S. Environmental Protection Agency
Region V, 5WD-TUB
230 South Dearborn Street
Chicago, Illinois 60604

SUBJECT: ALLIED SIGNAL, INC., DANVILLE WORKS PETITION DEMONSTRATION

Dear Mr. Burton:

As the United States Environmental Protection Agency (EPA) requested during the meeting held in Chicago on October 1, 1987, Allied Signal, Inc. (Allied) hereby submits two copies of this draft petition for Allied's Class I injection well in accordance with the requirements of proposed 40 C.F.R. 148 Subpart C, 52 Fed. Reg. 32474-76 (August 27, 1987). Even in the absence of a regulatory program, the demonstration presented in this petition satisfies the statutory requirements necessary for EPA to determine, pursuant to the Hazardous and Solid Waste Amendments of 1984, that continued operation of Allied's Danville injection well will be protective of human health and the environment for as long as the injected waste remains hazardous. Accordingly, Allied hereby requests that EPA approve this petition pursuant to its regulatory program, or that it otherwise make a determination pursuant to the 1984 Amendments, by no later than July 8, 1988.

Allied operates its Danville Works for the production of fluorocarbon refrigerant gases, which are used, among other applications, in residential and commercial air conditoners, refrigerators and freezers. Hydrochloric acid is also generated as a co-product of the plant process, and is sold as food grade acid to the food processing industry, or for use by the steel industry.

Process wastewater generated at the Danville Works is disposed of on-site through the use of a Class I injection well. Since January, 1988, a system has been in operation to neutralize this weakly acidic wastewater. Although the neutralized wastewater predominantly consists of salt water, it continues to be characterized as "hazardous waste" under State and Federal regulations because it contains low concentrations of arsenic, a naturally occurring substance present in Allied's raw material. Through the use of the on-site Class I injection well, the waste is placed in deep geologic formations -- which naturally contain fluids unfit for human consumption -- where it will remain isolated thousands of feet below ground for geologic time.

Under EPA's proposed Hazardous Waste Disposal Injection Restrictions program, the continued injection of any waste identified as a "hazardous waste" under EPA's regulations will be prohibited unless the waste meets EPA-specified treatment standards or EPA approves a petition demonstrating, to a reasonable degree of certainty, that waste injection will be protective of human health and the environment for as long as the waste remains hazardous. Subsection 148.20 (a) (1) (i) of the proposed regulations provides that such a demonstration may be made on the basis of a scientific analysis showing that there will be no vertical movement of injected fluids out of the injection zone, and no lateral movement of injected fluids to a point of discharge or interface with potentially useable groundwater, within ten thousand years. This petition provides that analysis, and demonstrates that the continued injection of wastewater at the Danville Works will be protective of human health and the environment for as long as the waste remains hazardous.

There are a number of features that combine to make the Danville Works injection site particularly favorable for waste disposal. The formations used for disposal extend laterally over a broad area, are free of faulting or other structural defects, and exhibit characteristics suitable for accepting and containing wastes deep below any source of potentially useable groundwater. For these reasons the Illinois Geological Survey has recognized that the formations being used at the Danville site are well suited for waste injection.

Perhaps the single most important characteristic of the Danville injection site is that the reservoir into which wastes are injected is naturally underpressurized, and has accepted injected wastes for fifteen years without exhibiting any significant pressure build up. The significance of this factor is that pressure is the principle driving force that could cause wastes to move upward from the reservoir into which they are injected. In the absence of such a driving force, injected fluids cannot move upward to threaten human health or the environment. Even if a driving force did exist, however, the injection reservoir in question is overlain by an extensive array of essentially impermeable geologic strata -- including portions of the Eminence formation, the Prairie du Chien group, and Maquoketa shale -- all of which are areally extensive and free of natural or artificial penetrations. These geologic barriers collectively consist of over one thousand feet of dense, low permeability rock between the injection reservoir and any potentially useable groundwater resources, and thus assure that waste injection at the Danville site will not pose a threat to human health or the environment.

To satisfy the requirements of EPA's proposed Hazardous Waste Disposal Injection Restrictions program, a detailed scientific analysis of the Danville injection site was undertaken. Essentially this analysis involved the application of sophisticated scientific modeling techniques to site-specific information on the Danville site. The purpose of the analysis was to reliably determine the maximum extent to which vertical movement of injected fluids may occur within the next ten thousand years.

The results of modeling demonstrate that there will be no vertical migration of injected fluids from the injection zone for at least ten thousand years. In fact, the model demonstrates that pressures within the injection reservoir will be so low that there will be no significant vertical movement of injected fluids even within the injection zone. Because there is negligible lateral flow of injection zone fluids and the Danville site is far removed from any potential point of discharge or interface with potentially useable groundwater sources, it is apparent that injected fluids will effectively be entombed for geologic time.

osed regulations require that the results of certain mechanical s be submitted prior to submission of the final petition. We the final petition after promulgation of the regulations to anges in the rule. It is our understanding that the final rule sued until the second quarter of 1988 and EPA is requesting petition as soon as possible, even if it means submitting a al petition. To honor that request we are submitting this draft tively scheduled a MIT for the last two weeks in March of this ults of the tests will be forwarded to your office upon an addendum to this draft petition.

EPA information provided in a meeting held in Springfield, ebruary 4th, we understand that there is some uncertainty as to analysis individual reviewers may consider necessary to satisfy rements. Allied believes that the attached draft petition fully requirements of EPA's proposed regulations and is sufficient to determine, pursuant to the Hazardous and Solid Waste Amendments operation of Allied's Danville well will be protective of human environment for as long as injected wastes remain hazardous. the earliest possible notice if you believe any additional analysis is necessary.

3/31/88

stand that EPA and the Illinois Environmental Protection Agency completeness review of this petition within thirty-five days of d will advise Allied of any deficiencies on an ongoing basis so review and revisions can be completed no later than April 25, n the final petition, we request that EPA determine that ation of the Allied injection well be protective of human health ment, and publish notice of its determination, in accordance ection 30004 (i), no later than July 8, 1988.

under penalty of law that I have personally examined and am the information submitted in this petition and all attached that, based on my inquiry of those individuals immediately obtaining the information, I believe that the submitted true, accurate, and complete. I am aware that there are alties for submitting false information, including the fine and imprisonment.

Sincerely,

Don M. Phillips
Plant Manager

lman - (1 copy)
nvironmental Protection Agency
tion
f Land Pollution Control
hill Road
d, Illinois 62706

Well Installation and Carbon Tetrachloride Measurements

Prepared for:
ALLIED SIGNAL, INC
Danville, Illinois

January, 1988

38

WESTON
MANAGERS DESIGNERS/CONSULTANTS

WELL INSTALLATION AND CARBON TETRACHLORIDE MEASUREMENTS

January 1988

Prepared for:

Allied Signal, Inc.
Danville, Illinois

Prepared by:

Roy F. Weston, Inc.
100 Corporate North, Suite 101
Bannockburn, Illinois 60015

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EXECUTIVE SUMMARY

This report describes well installation, measurements, and interpretation of data related to subsurface carbon tetrachloride (CT) at the Allied Signal, Inc., Danville, Illinois plant.

As part of this project, one new 6-inch recovery well and seven new monitoring wells were installed. Additionally, two sets of water level measurements and CT free phase thickness measurements were taken.

In accordance with the Allied RFP, special care was taken to prevent sedimentation in the wells and to obtain detailed stratigraphic information. Because of a lack of stratigraphic data from previously installed (1979) wells, it is difficult to compare data from the new wells to data from old ones.

Water level measurements confirm that shallow groundwater is flowing northwestward. CT thickness measurements indicate that free-phase CT has migrated downward until encountering a dense till layer at a depth of approximately 15 feet. The mass of subsurface free-phase CT is concentrated near the railroad tracks and the above-ground CT tank.

Subsurface CT occurrence and mobility appears to be closely related to a sand lens which is present immediately above the dense till layer. The sand lens functions as a reservoir, and lateral migration of free-phase CT in silt beyond the sand lens is believed to be minimal. The lateral extent of the free-phase CT and of the sand lens is well defined on the southern and eastern sides of the spill area, but not exactly defined on the northern or western sides. However, consistent with the findings of the Geraghty & Miller reports, free-phase CT does not appear to extend beyond the central plant area.

SECTION 1

INTRODUCTION

This report describes methods and results of a groundwater project conducted at the Allied Signal, Inc., Danville, Illinois facility by Roy F. Weston, Inc. (WESTON). The scope of work was detailed in a work plan submitted by WESTON to Allied on 14 September 1987. As stated in the work plan, the project had three objectives:

- Objective 1 - Install and develop one 6-inch recovery well to replace existing 2-inch recovery well W-11.
- Objective 2 - Install and develop 7 new monitoring wells in or near the zone of free-phase carbon tetrachloride (CT), to delineate free-phase CT.
- Objective 3 - Determine the distribution and thickness of free-phase CT in the shallow aquifer.

These objectives were accomplished by WESTON during field work conducted in September and October, 1987. This report describes well designs, well construction techniques, well development, and CT thickness measuring techniques. Also provided are well construction data and results of CT thickness measurements. Finally, site geology is discussed as it relates to the distribution and potential mobility of CT.

This project was managed and staffed from WESTON's Bannockburn, Illinois office. WESTON subcontracted drilling services from Exploration Technology, Inc. of Madison, Wisconsin. Geotechnical laboratory services were provided by Patrick Engineering of Glen Ellen, Illinois. Surveying of selected well locations and elevations were provided by Kreidler and Associates of Danville, Illinois. The project was completed in three phases coinciding to work plan objectives.

On 9 September 1987 project activities were initiated with installation of the 6-inch recovery well. This required two days to complete. Following geotechnical analysis of several sediment samples obtained during recovery well installation, and procurement of the proper monitoring well construction materials, monitoring well installation was initiated on September 24, 1987. Installation and construction of the monitoring wells required four days. The new wells were then allowed to stabilize for one week prior to development.

On 5 October 1987 WESTON started to develop the newly installed wells. Development of new wells and 5 previously existing wells required ten days. Following development, the

wells were allowed to stabilize for approximately 5 days prior to obtaining water level measurements. On 13 October and 19 November 1987, WESTON conducted measurements to determine water table levels and the distribution and thickness of free-phase CT.

SECTION 2

WELL DESIGN AND CONSTRUCTION

2.1 RECOVERY WELL

Well W-11 was replaced with a large diameter, more efficient, recovery well. This well was originally installed as a 2-inch inside diameter (I.D.) monitoring well, and was later used to recover free-phase CT. The replacement well is also labeled W-11, and was installed 2 feet east of the original well so that existing recovery equipment would not have to be relocated.

The new W-11 boring was drilled with a Central Mine Equipment (CME) 850 track mounted drill rig with 8.25-inch I.D. hollow-stem augers. The drilling log for well W-11 is provided in Appendix A. Three split-spoon samples from this boring were retained for laboratory analysis. Grain size (sieve) analyses were performed on two of these samples to guide the selection of monitoring well construction materials. The third split-spoon sample was sent to Chemical Waste Management, Inc. for analysis of selected chemical parameters, to provide documentation for proper disposal of drill cuttings. Grain size distribution and chemistry data for these samples are provided in Appendix B.

Volatile organic compounds (VOC) readings were obtained throughout the drilling and construction of recovery well W-11. VOC measurements from split-spoon samples were obtained from a depth 10 feet below the land surface to the bottom of the boring (16.34 feet). These readings are recorded on the drilling logs (Appendix A).

Based on field observation of split-spoon samples, a uniform silt layer occurred to a depth of 13.2 feet in W-11. This layer is underlain by a dense clay/silt till layer. A Shelby tube sample was obtained in the dense till layer from depths of 15.5 to 16.2 feet to determine vertical hydraulic conductivity of the dense till. Test results indicate that the hydraulic conductivity of the till sample was 1.2×10^{-7} cm/sec (Appendix B).

Proper vertical placement of the recovery well in the boring required the bottom of the screened interval to be flush with the top of the dense till layer. The recovery well was designed with a 2-foot sump to collect sediment and free-phase CT. The sump consists of a 2-foot length of steel casing, welded to the bottom of the well screen. The sump has a steel cap welded to the bottom. The well screen and casing are both 6-inch I.D. #304 stainless steel. The well screen is 3-feet long, and has continuous 0.010 inch slots. The screen/casing joint is threaded, and the 2-foot sump was double welded to the screen (Figure 2-1).

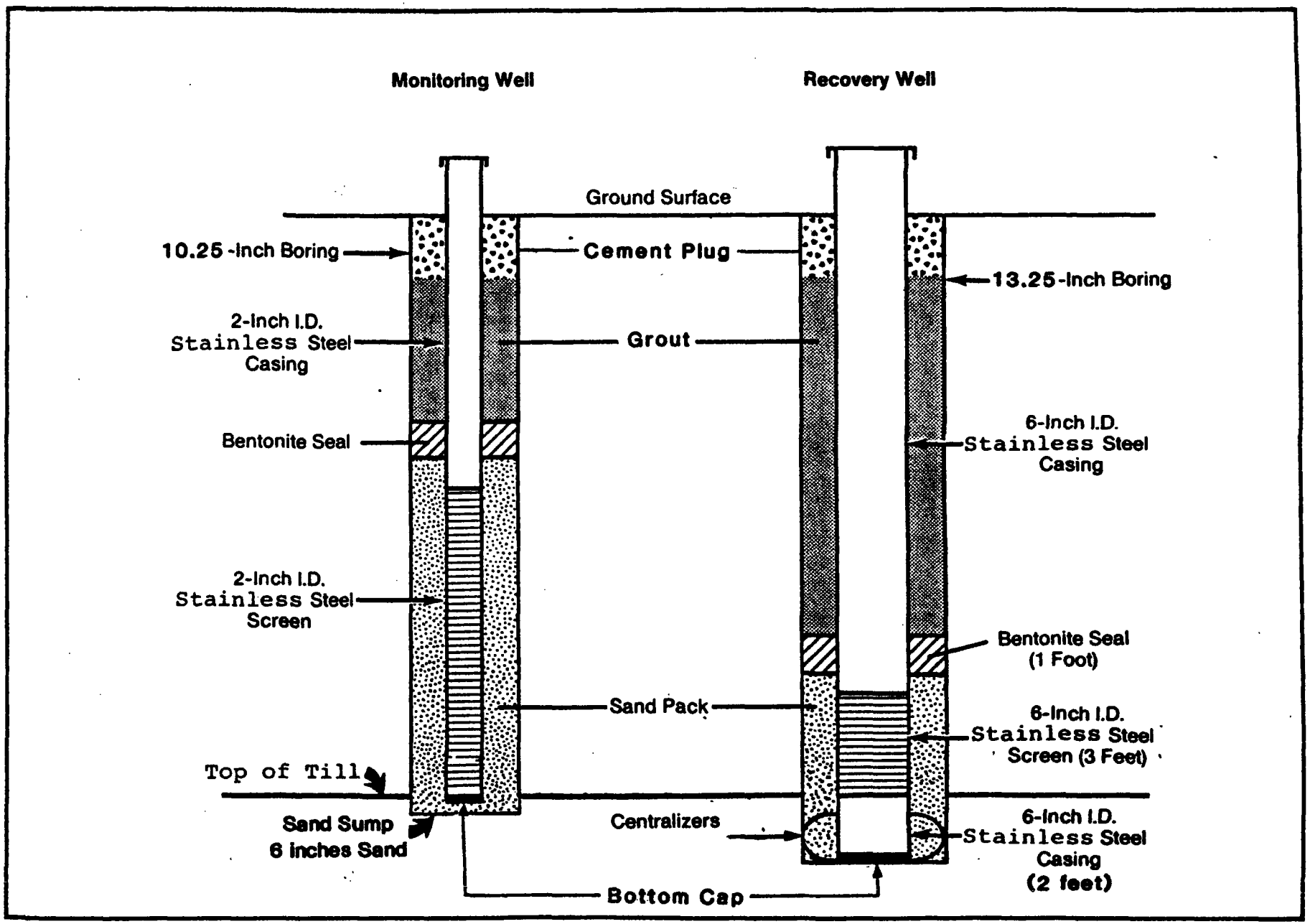


FIGURE 2-1 SCHEMATIC WELL DESIGN

The W-11 boring was drilled with 13.25 inch OD hollow stem augers to provide the maximum possible sand pack thickness. The sand pack consisted of double-washed number 30 Red Flint filter sand. During installation, the sand was poured inside the augers to a level above the base of the augers. The augers were then pulled up one foot at a time, allowing sand inside of the augers to collapse around the well screen. Measurements were made continuously to ensure that the augers were not raised above the top of the sand pack. The sand pack was installed to a depth 1 foot above the top of the well screen. A 1-foot thick hydrated bentonite-pellet seal was installed above the sand pack to isolate the recovery zone. Bentonite cement grout was installed above the seal. Above the grout, a 3-foot concrete plug was installed to anchor the recovery well to the existing concrete equipment pad. The well casing projects about 1-foot above the pad.

2.2 MONITORING WELLS

Seven new monitoring wells were installed to facilitate monitoring of groundwater levels and CT thickness. These are the N-Series wells, and are numbered from N-1 through N-7. Well locations are shown on Figure 2-2. Drilling logs are provided in Appendix A.

The N-Series wells were designed to be fully screened in the silt unit which overlies the dense till. Monitoring well borings were drilled with 6.25-inch I.D./10.25-inch O.D. hollow stem augers. As in the case of recovery well W-11, the large boring diameter was specified to facilitate installation of a thick sand pack, thereby preventing sedimentation in the wells.

Well screens were installed 0.5 feet into the dense till so that the bottom of the slotted interval was flush with the top of the till. Well screens have continuous slots with 0.006 inch spacings, and are ten feet long. Monitoring well screens and casings are threaded, flush joint, #304 stainless steel.

Construction and installation procedures for monitoring wells were the same as for recovery well W-11, however, construction differed at the surface. Monitoring wells N-4, N-5 and N-7 were located in high traffic areas and required subgrade completions. These wells were secured in water tight iron valve boxes anchored in concrete pads and set at grade. Monitoring wells N-1, N-2, N-3, and N-6 were above ground completions and were fitted with 4-inch I.D. steel protective casings, with locking caps.

2.3 WELL DEVELOPMENT

All N-Series wells and 5 previously existing wells were developed using the surge block technique. This technique

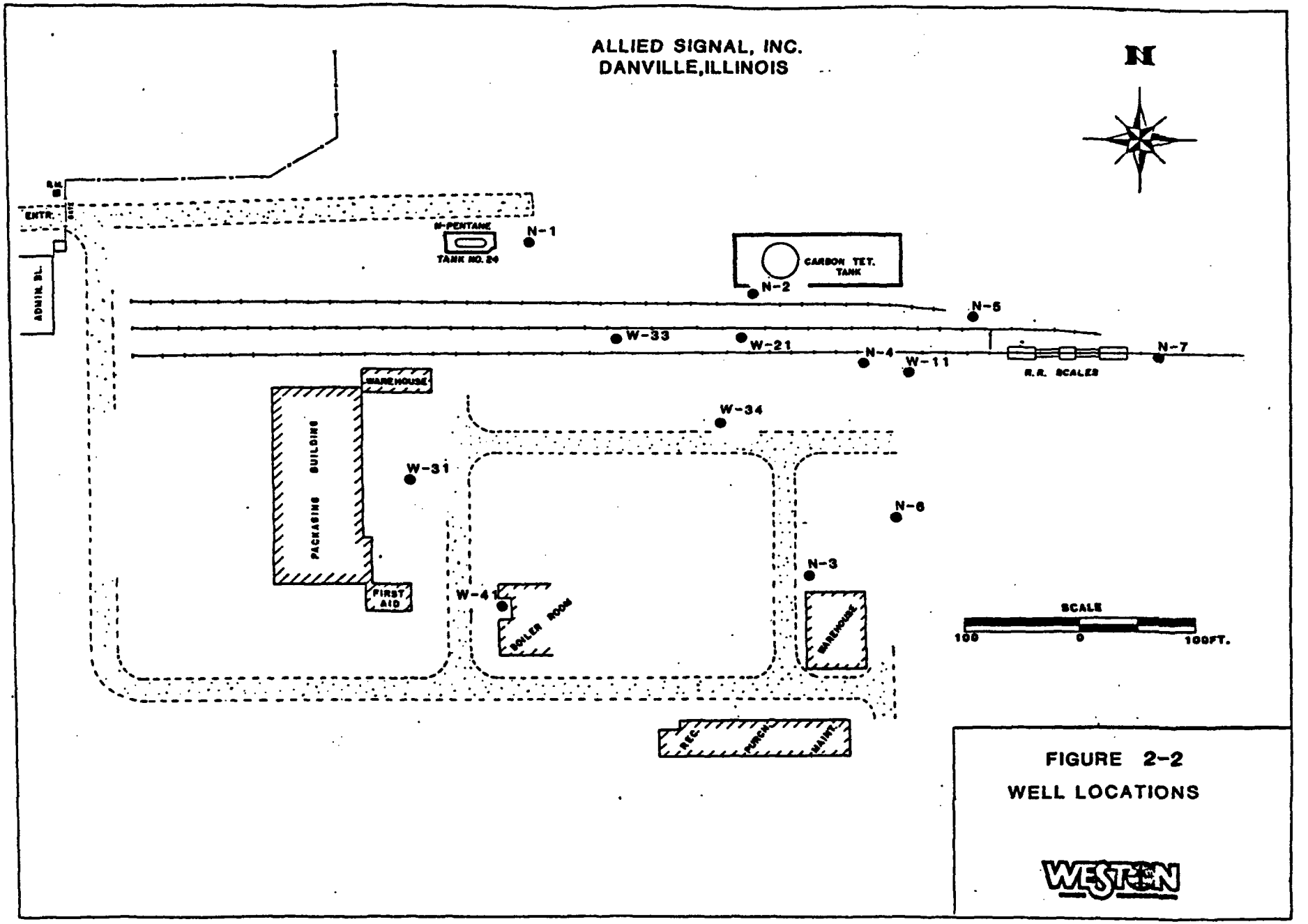


FIGURE 2-2
WELL LOCATIONS

WESTON

requires the screened interval to be repeatedly agitated using a surge block. Turbid water is pumped from the well at various times during development, until clear water is obtained.

A 1.75-inch O.D. PVC pipe (with end cap) was used to surge water in the screened interval. The rod was rapidly moved up and down to create turbulence and increase velocities in the well and sand pack. Following agitation, turbid water was pumped into 55-gallon drums. Approximately 100 gallons were removed from each monitoring well. Table 2-1 provides a summary of measurements made during well development. Initially, most new and previously existing wells produced turbid water with minor quantities of CT. Following several pump and recovery cycles, most of the wells started to yield less turbid water. Fluids pumped from the wells during development were collected and stored in decanting drums providing by Allied. The fluids were allowed to phase separate. Separation was performed by WESTON and the separate fluids were subsequently managed by Allied.

2.4 WELL SURVEYING

Following construction of the recovery well and monitoring wells, well locations and elevations were surveyed. Elevations were based on a plant bench mark located near the main plant entrance. A site base map was prepared showing the locations of all newly installed wells (Figure 2-2). Table 2-2 provides all vertical measurements obtained during the survey.

2.5 WELL INSTALLATION QUALITY CONTROL

Quality control during well installation focused on thorough decontamination and careful handling of equipment and construction materials.

All drilling and sampling equipment was decontaminated prior to use at each well site. Decontamination of drilling equipment and well construction materials consisted of a high pressure steam wash using potable tap water. This was followed by scrubbing to remove any residual particles, using soap (alconox) and water. Methanol was used to remove any obvious hydrocarbon residues. Following this, a final clean water rinse was used to remove any remaining decontamination of solutions. The cleaned equipment and/or materials was then allowed to air dry. Personnel wore clean surgical gloves while handling well construction materials. Gloves were changed every time a worker was in contact with potentially contaminated equipment.

TABLE 2-1
WELL DEVELOPMENT MEASUREMENTS AND OBSERVATIONS
ALLIED SIGNAL INC.
DANVILLE, ILLINOIS

MONITORING WELL NO.	PURGING EQUIPMENT	PURGED VOLUME (gal.)	WATER QUALITY AFTER DEVELOPMENT	CT (VISIBLE)	NOTABLE WELL CHARACTERISTICS	DATE(S) DEVELOPED (1987)
M-1	1/2 HP PUMP	100	GOOD - CLEAR TO FAIRLY CLEAR	NO	SLOW RECHARGE, MINOR FOAM WHEN PUMPING	10-7 THRU 10-8
M-2	1/2 HP PUMP	165	GOOD - CLEAR ABOVE CT	YES	CARBON TET. LAYER AT BASE, NEVER WENT DRY	10-12 THRU 10-13
M-3	1/2 HP PUMP	100	GOOD - CLEAR TO FAIRLY CLEAR	NO	VERY SLOW RECHARGER	10-6 THRU 10-7
M-4	1/2 HP PUMP	155	GOOD - CLEAR ABOVE CT	YES	CARBON TET. LAYER AT BASE, NEVER WENT DRY	10-7 THRU 10-8
M-5	1/2 HP PUMP	170	GOOD - CLEAR ABOVE CT	YES	CARBON TET. LAYER AT BASE, NEVER WENT DRY	10-7 THRU 10-8
M-6	1/2 HP PUMP/BAILOR	85	GOOD - CLEAR TO FAIRLY CLEAR	NO	VERY SLOW RECHARGER	10-12
M-7	1/2 HP PUMP	100	GOOD - CLEAR	NO	VERY SLOW RECHAGER, WHITE FOAM WHEN PUMPING	10-8 THRU 10-9
M-11	2 - 1/2 HP PUMPS	275	GOOD - CLEAR ABOVE CT	YES	GOOD RECHARGER, CARBON TET. LAYER AT BASE	10-9 AND 10-13
M-34	1/2 HP PUMP	140	GOOD - CLEAR ABOVE CT	YES	FAIRLY GOOD RECHARGE, CARBON TET. LAYER AT BASE	10-12
M-33	1/2 HP PUMP	80	GOOD - CLEAR ABOVE CT	YES	CARBON TET., ODOR AND VISIBLE. HARD PUMPING DUE TO OBSTRUCTIONS IN CASING	10-13 THRU 10-15
M-41	1/2 HP PUMP/BAILOR	100	FAIR, SEMI-CLEAR CLOUDY	NO	GREY DIRTY WATER, BAD SEWER SMELL, POSSIBLE BROKEN CASING AT 17 FEET	10-15 THRU 10-16
M-31	1/2 HP PUMP	145	CRYSTAL CLEAR	SLIGHTLY	TRACE CT ODOR AND SOME VISIBLE, BUT NOT AS APPARENT AS OTHER WELLS. HARD PUMPING THE BOTTOM 10 FEET OF THE WELL.	10-14 THRU 10-15
M-21C	BAILOR	25	UNABLE TO TELL, ALMOST ALL CT	YES	SHALLOW WELL, 3/4 CT, UNABLE TO DETERMINE WATER QUALITY	10-12

NOTE: CT CARBON TETRACHLORIDE

TABLE 2-2
WELL ELEVATION MEASUREMENTS
ALLIED SIGNAL,INC.
DANVILLE, ILLINOIS
OCTOBER 13, 1987

	ELEVATIONS			
WELLS	GROUND	TOP OF CONCRETE	TOP OF OUTER PIPE	TOP OF INNER PIPE
N-1	652.5	652.55	655.69	655.46
N-2	651.9	651.96	653.75	653.50
N-3	652.1	652.16	655.19	654.96
N-4	652.3	652.46	652.48	651.34
N-5	652.0	651.97	651.98	651.15
N-6	652.4	652.41	654.70	654.46
N-7	652.6	652.71	652.72	651.40
W-11	652.9	653.05	654.13	654.13
W-21C	652.3	652.68	653.50	653.50
W-31	652.1	---	654.41	654.39
W-33	652.2	652.44	655.97	655.96
W-34	652.2	---	652.58	652.57
W-41	652.1	652.37	655.90	655.90

SECTION 3

GEOLOGY AND GROUNDWATER DATA

3.1 GEOLOGY

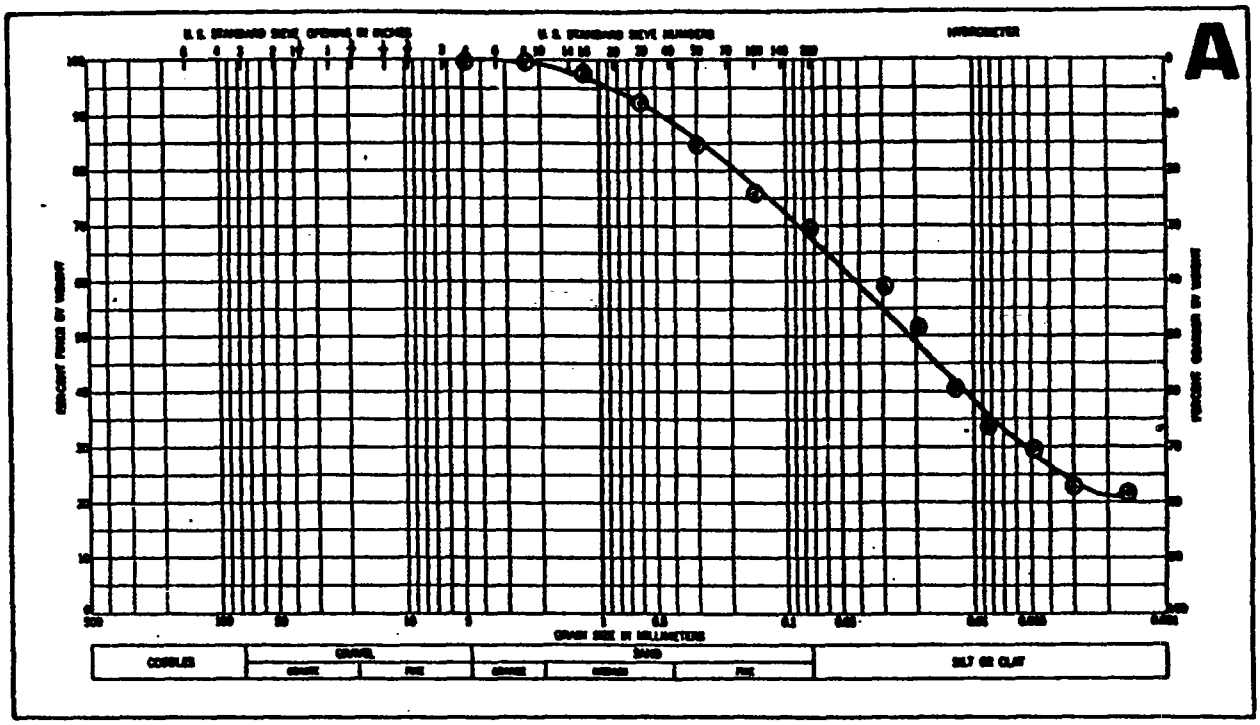
The Allied facility is underlain by unconsolidated glacial deposits. Based on logs of water supply test wells drilled at the plant in 1959 (Appendix C), these deposits are approximately 120 feet thick and lie on Pennsylvanian-aged dolomitic shale. Two distinct stratigraphic units were observed during installation of well W-11 and the monitoring wells. A silt layer was observed to a depth of 15 to 20 feet, and was underlain by a dense till layer. The water well logs indicate that this till layer is approximately 100 feet thick at the site.

The upper silt layer had an olive brown color and uniform texture. A sediment sample from well W-11 was analyzed for grain size distribution to aid the selection of well construction materials. The grain size distribution for the silt layer sample is shown in Figure 3-1. Based on this analysis, the silt layer is comprised of 47% silt, 28% sand, and 25% clay. Based on field observations, the silt was moist to semi-dry from 0 to 5 feet below land surface, and visibly saturated at depths greater than 5 feet.

Sand lenses were observed in the silt layer in four N-Series borings. A thin layer of fine to medium well-sorted sand was present at the base of the silt layer, in well borings N-1, N-2, N-4, and N-5. A lens of poorly sorted, silty sand was present at a depth of approximately 11 feet in borings N-2 and N-5. Figure 3-2 illustrates sand lens thickness in these borings. The lenses are believed to play a significant role in the subsurface occurrence and mobility of CT and groundwater, as discussed in Section 4.

In borings N-2, N-4, N-5 and N-6, the silt layer/till interface was transitional. A gradual change of color from brown to grey was observed in the lower two feet of the silt layer, along with an increase of density. In some borings the basal sand layer was overlain by grey silty clay. The layer/till interface was identified as that point where the color was consistently dark grey, where the texture was finer, and where blow counts were consistently higher (greater than 15 blows per six inches).

A till sample from W-11 was analyzed for grain size distribution, and the results are shown in Figure 3-1. The graph indicates that the till layer consists of 65% silt, 30% clay and 5% sand. Based on field observation, the moisture



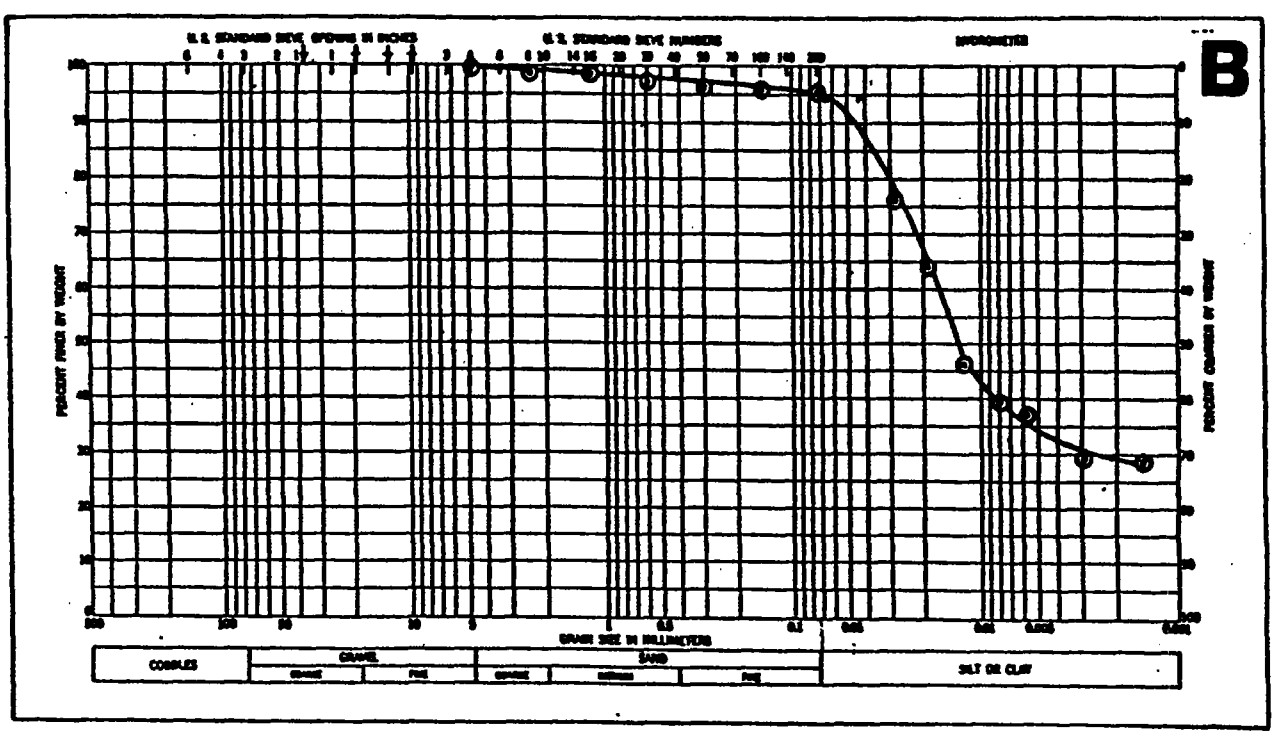
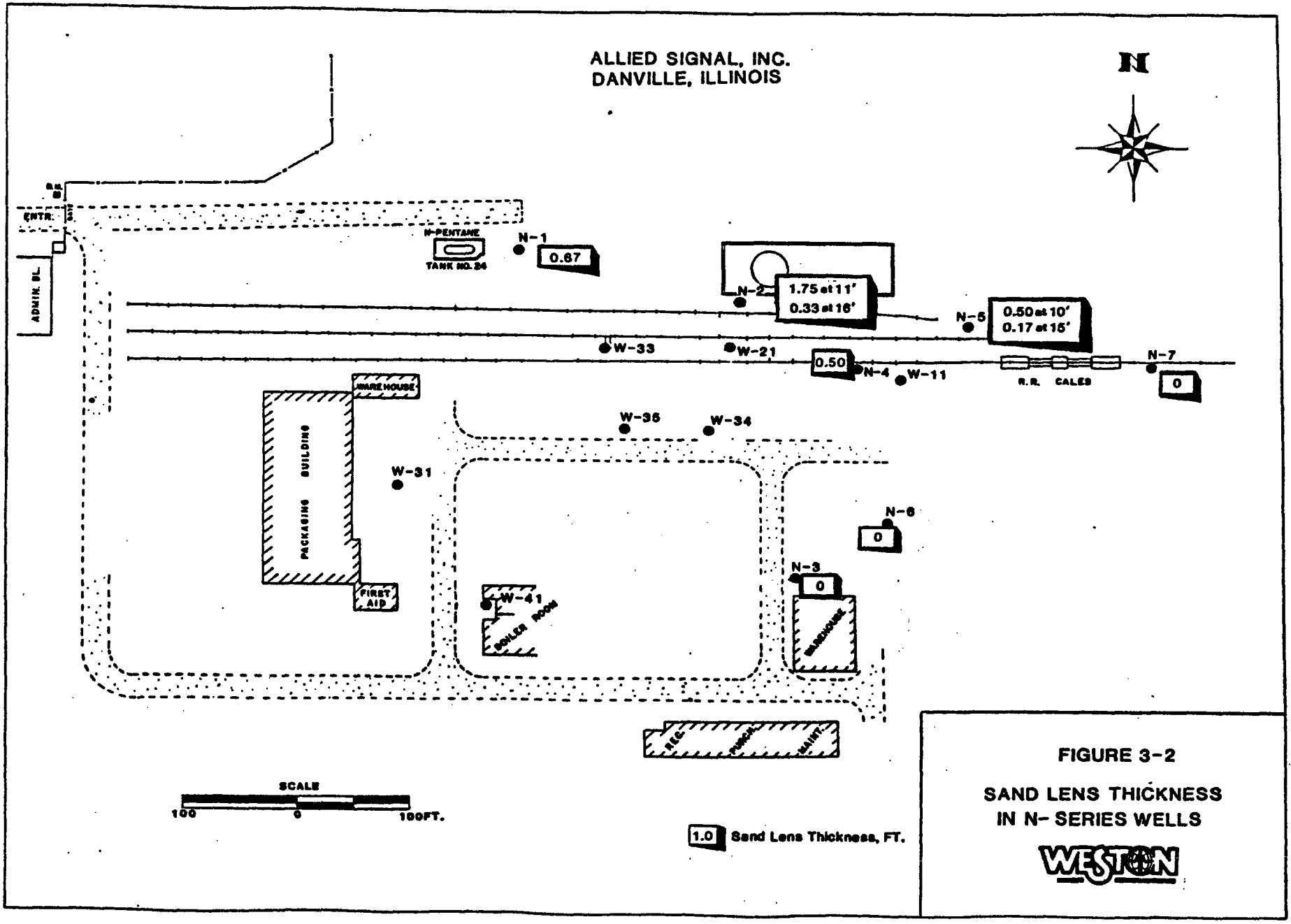


FIGURE 3-1
GRAIN SIZE DISTRIBUTION GRAPHS

A: SILT LAYER B: DENSE TILL


ALLIED SIGNAL, INC.
DANVILLE, ILLINOIS
N
ENTR.
ADMIN. BL.
N-PENTANE
TANK NO. 24
N-1
0.67
N-2
1.75 at 11'
0.33 at 16'
N-5
0.50 at 10'
0.17 at 15'
W-33
W-21
0.50
N-4
W-11
R.R. CALES
N-7
0
W-35
W-34
W-31
WAREHOUSE
PACKAGING BUILDING
FIRST AID
W-41
BOILER ROOM
N-6
0
N-3
0
WAREHOUSE
SCALE
100
0
100FT.
1.0 Sand Lens Thickness, FT.
FIGURE 3-2
SAND LENS THICKNESS
IN N- SERIES WELLS
WESTON
DRW. NO. C-101387

content of the till was semi-dry. The laboratory moisture content was 11.0% and the dry density was 124.0 pounds per cubic foot (pcf). A Shelby tube sample from the till layer was analyzed for vertical hydraulic conductivity in the laboratory. This resulted in a hydraulic conductivity coefficient (K) of 1.2×10^{-7} cm/sec. Sediment laboratory results are provided in Appendix B.

The elevation of the top of the till layer is shown in Figure 3-3, based on measurements made in N-Series wells. Contours in Figure 3-3 indicate that the till surface is relatively high on the southern side of the railroad tracks. The till-surface configuration is believed to affect groundwater and CT occurrence and mobility, and discussed in Section 4.

3.2 WATER TABLE LEVELS

Water table levels were measured on two dates from all N-Series monitoring wells, and from selected W-Series wells. Water table data are shown in Table 3-1. Figure 3-4 and Figure 3-5 show water table contours for 13 October 1987 and 19 November 1987, respectively. Both of these maps indicate that the general direction of groundwater flow at the site is to the northwest. Both maps also indicate a relatively flat water table in the central part of the study area, where the water table elevation is approximately 650 feet. Assuming that groundwater flow is perpendicular to the head contours, groundwater diverges just south of the tracks, with flow components to the north and to the southwest. The relatively flat water table and divergent flow may be due to either one or both of the following:

- Thin sand lenses observed in the upper silt layer may cause localized equilibration of head, resulting in the nearly flat water table between wells N-6, W-11, and W-34.

- Free-phase CT may obstruct groundwater flow in the silt. An obstruction would cause a flattening of the water table upgradient from it (between wells N-6, W-11, and W-34), and a steepening of the gradient as water accelerates around it (near wells N-1 and N-5).

The water table configurations shown in Figures 3-4 and 3-5 differ slightly from that provided by Geraghty and Miller (report dated March 1987; copy in Appendix D). Water table levels were similar, suggesting that the differences were not due to natural seasonal fluctuations. The differences may be due to different spacings of monitoring wells. Despite the different configurations at a very localized scale, all three sets of data indicate that groundwater in the upper silt layer generally flows northwestward.

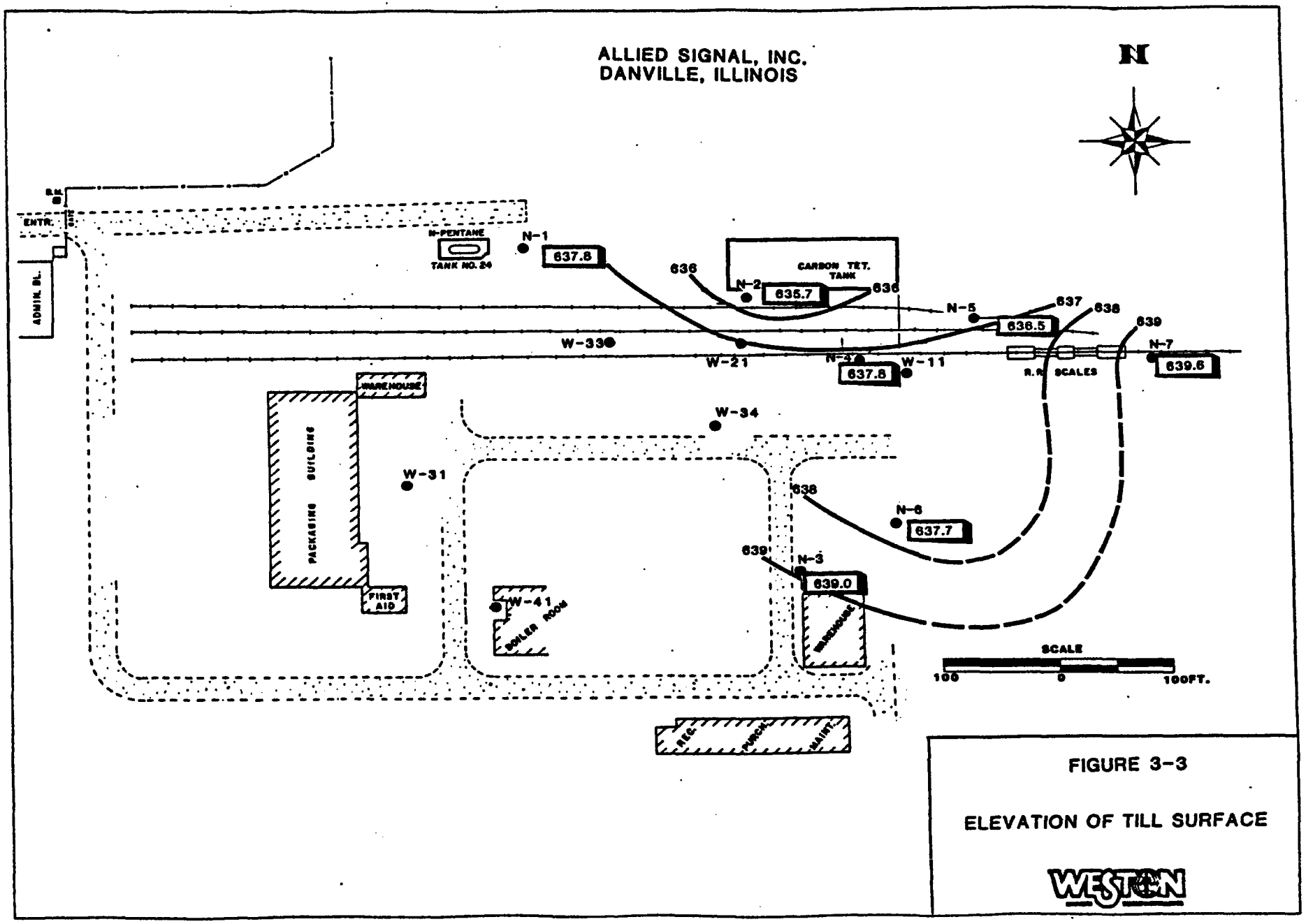
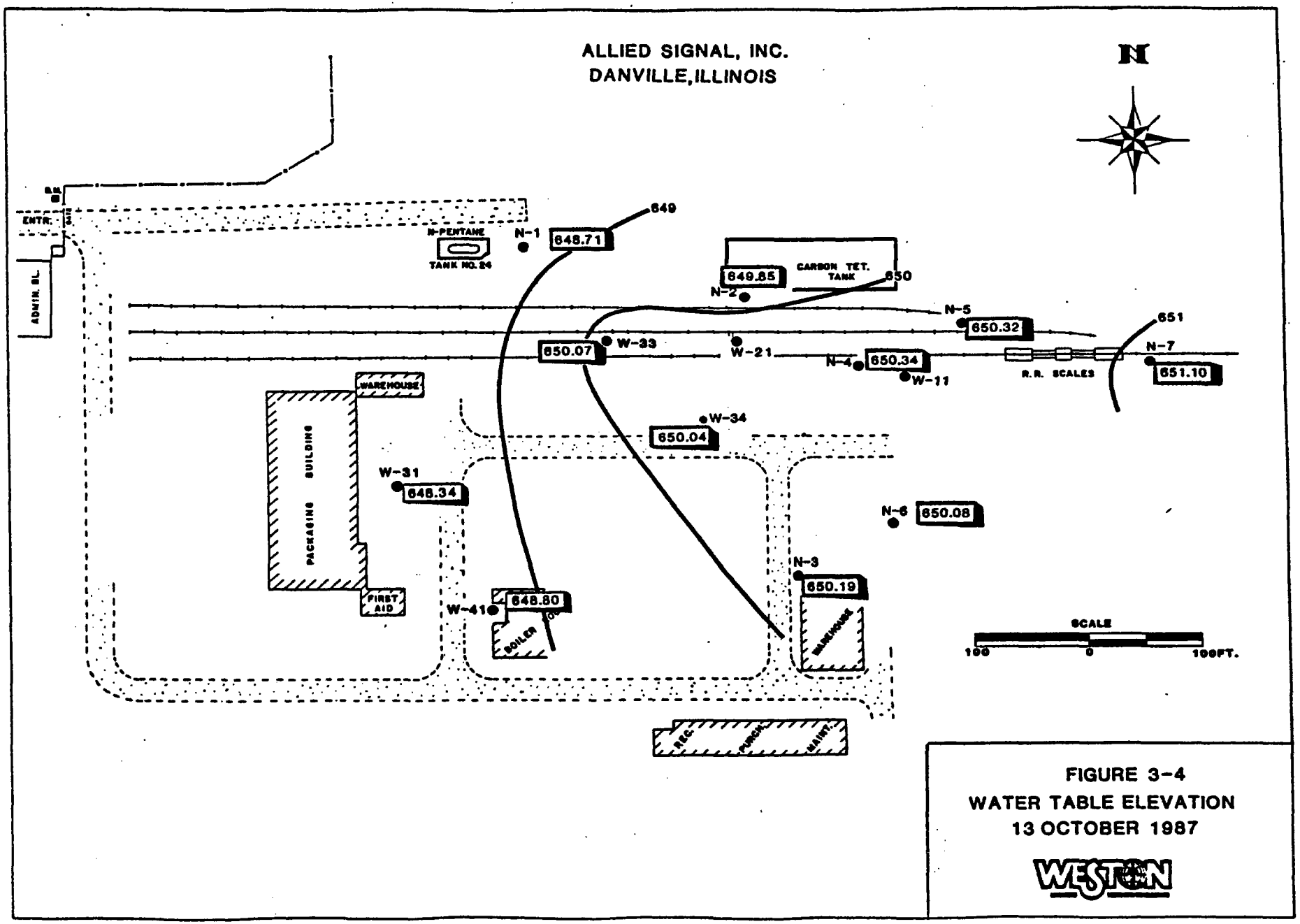

ALLIED SIGNAL, INC.
DANVILLE, ILLINOIS
N
ENTR.
ADMIN. BL.
N-PENTANE
TANK NO. 24
N-1
637.8
636
CARBON TET.
TANK
N-2
635.7
636
N-5
637
638
636.5
639
N-7
639.6
W-33
W-21
N-4
637.8
W-11
R.R. SCALES
WAREHOUSE
PACKAGING BUILDING
W-34
W-31
638
N-6
637.7
639
N-3
639.0
FIRST AID
W-41
BOILER ROOM
WAREHOUSE
SCALE
100
0
100FT.
REC.
PURCH.
MAINT.
FIGURE 3-3
ELEVATION OF TILL SURFACE
WESTON

TABLE 3-1
GROUNDWATER ELEVATIONS
ALLIED SIGNAL, INC.
DANVILLE, ILLINOIS

WELL NUMBER	TOP OF INNER PIPE	GROUNDWATER (10/13/87) DEPTH	ELEV.	GROUNDWATER (11/19/87) DEPTH	ELEV.
M-1	655.46	6.75	648.71	7.20	648.26
M-2	653.50	3.65	649.85	4.57	648.93
M-3	654.96	4.77	650.19	5.47	649.49
M-4	651.34	1.00	650.34	1.78	649.56
M-5	651.15	0.83	650.32	1.90	649.25
M-6	654.46	4.38	650.08	4.79	649.67
M-7	651.40	0.30	651.10	0.94	650.46
M-11	654.13	3.85	650.28	4.55	649.58
M-21C	653.50	4.78	648.72	5.01	648.49
M-31	654.39	6.05	648.34	6.40	647.99
M-33	655.96	5.89	650.07	6.64	649.32
M-34	652.57	2.53	650.04	3.53	649.04
M-41	655.90	7.10	648.80	7.45	648.45


ALLIED SIGNAL, INC.
DANVILLE, ILLINOIS
N
ENTR.
ADMIN. BL.
N-PENTANE
TANK NO. 24
N-1
648.71
649
649.85
CARBON TET.
TANK
650
N-2
N-5
650.32
651
650.07
W-33
W-21
N-4
650.34
W-11
R.R. SCALES
N-7
651.10
WAREHOUSE
PACKAGING BUILDING
W-34
650.04
W-31
648.34
N-6
650.08
N-3
650.19
FIRST AID
W-41
648.80
BOILER
WAREHOUSE
SCALE
100
0
100FT.
REC.
PURCH.
MAINT.
FIGURE 3-4
WATER TABLE ELEVATION
13 OCTOBER 1987
WESTON

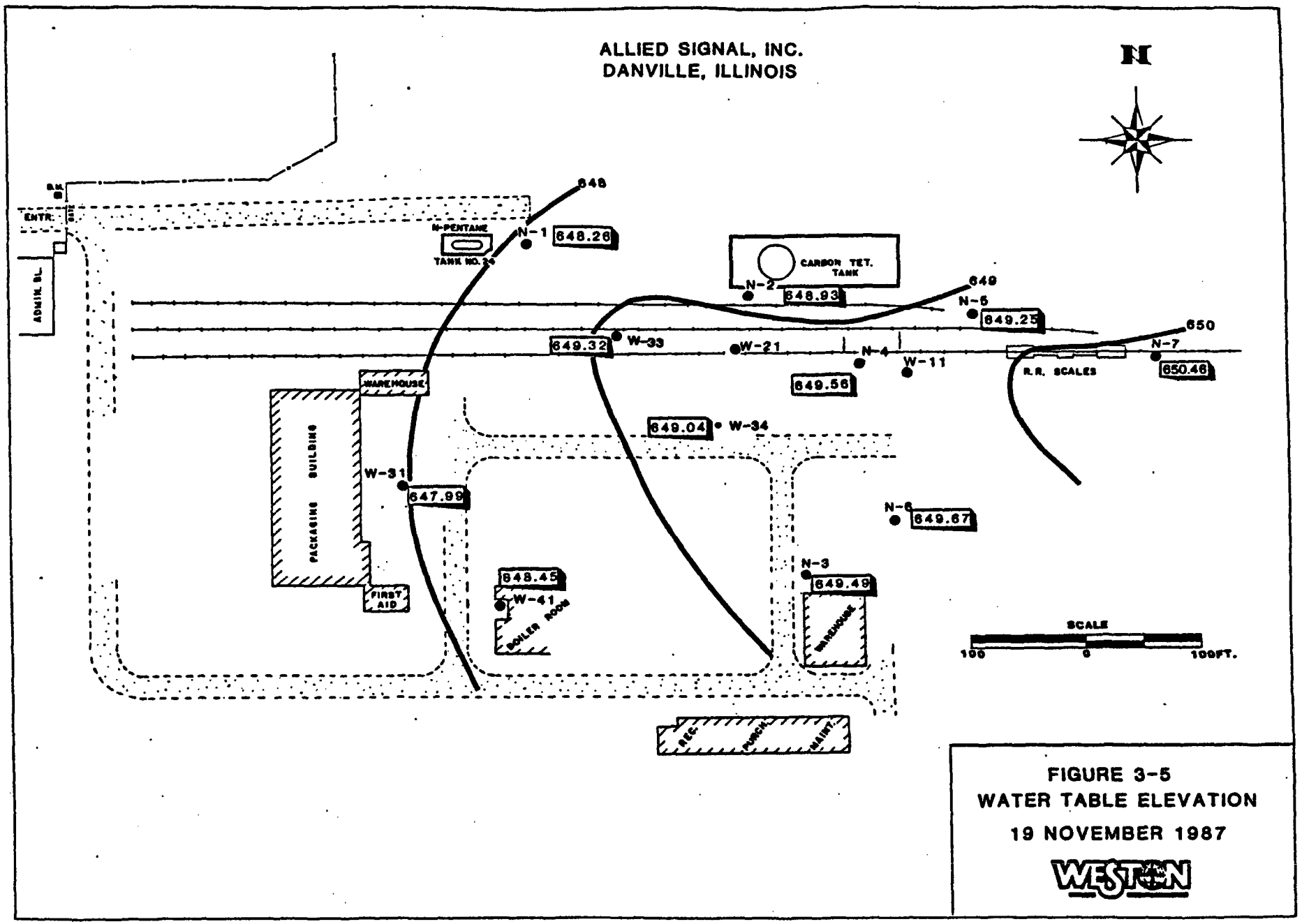


FIGURE 3-5
WATER TABLE ELEVATION
19 NOVEMBER 1987

WESTON

Water levels from well W-21C were not used to make Figures 3-4 and 3-5, as the levels in that well were anomalously low. This is believed to be due to the fact that W-21C is only screened in the lower 3 feet of the silt. The discrepancy is attributed to the re-distribution of water and CT in W-21C as a result of pumping during development. CT thickness measurements from this well are also believed to be inaccurate, as described in Section 4 and Appendix E.

SECTION 4

CARBON TETRACHLORIDE DATA

4.1 CT THICKNESS MEASUREMENTS

CT thickness measurements were made in all N-Series wells and selected W-Series wells on 13 October 1987 and 19 November 1987. The first set of measurements was made with an interface probe manufactured by Oil Recovery Systems, Inc. The device measures changes in fluid conductivity and light refraction. Measurements taken on 19 November 1987 were made with the interface probe and with bailers. Unadjusted CT thickness data are provided in Appendix F.

The objective of these measurements has been to determine the thickness of CT in the silt layer. For those measurements made with the interface probe, this was done by subtracting the elevation of the top of the till layer from the elevation of the CT/water interface. For wells installed during this investigation (N-Series and W-11) the depth of the silt/till interface was determined from split-spoon samples obtained during well installation. The stratigraphic data from previously installed wells (W-Series) is less exact; therefore, the elevation of the interface could not be reliably determined with these wells. Many of these wells have persistant siltation problems. The top of the dense till is not identified in a manner consistant with the N-Series wells.

The bailer method indicates the thickness of CT in each well. To estimate the thickness in the silt layer, one must subtract the length which each well penetrates into the dense till layer. Data regarding this distance are considered reliable for the N-Series wells. However, the amount of penetration into the till layer cannot be accurately determined for previously installed (W-Series) wells, due to uncertainty about the depth of the top of the dense till.

Adjusting for well penetration into the till layer, CT thickness measurements for N-Series wells and W-11 are shown in Table 4-1. Based on a comparison of interface probe measurements, adjusted CT thickness measurements were generally greater in November than in October. This may reflect the fact that the wells had not completely re-equilibrated after being developed in October. Adjusted CT thickness obtained by the bailer method were generally smaller than those obtained by the interface probe method. Reasons for the discrepancy are not exactly clear. However, the bailer method has problems which, we believe, make bailer data more suspect than interface probe data. These problems are described below.

TABLE 4-1
FREE PHASE CT MEASUREMENTS
OCTOBER AND NOVEMBER, 1987
ALLIED SIGNAL,INC.
DANVILLE,ILLINOIS

OCTOBER 13, 1987

WELL NUMBER	TOP OF TILL ELEVATION (A)	BOTTOM OF WELL ELEVATION (B)	DEPTH OF SUMP (C)	TOP OF CT ELEVATION (PROBE) (D)	CORRECTED CT THICKNESS-PROBE (D-A)	CT THICKNESS MEASUREMENT (BAILER) (F)	CORRECTED CT THICKNESS-BAILER (F-C)
N-1	637.83	637.49	.34	637.95	.12	* BAILER MEASUREMENT NOT TAKEN DURING THE FIRST ROUND OF READINGS	
N-2	635.73	635.40	.33	637.22	1.49		
N-3	639.02	638.77	.25	NOT DETECTED	NOT DETECTED		
N-4	637.80	637.47	.33	640.21	2.41		
N-5	636.50	636.25	.25	640.26	3.76		
N-6	637.73	637.42	.31	NOT DETECTED	NOT DETECTED		
N-7	639.56	639.27	.29	NOT DETECTED	NOT DETECTED		

TABLE 4-1 (CONTINUED)
FREE PHASE CT MEASUREMENTS
OCTOBER AND NOVEMBER, 1987
ALLIED SIGNAL,INC.
DANVILLE,ILLINOIS

NOVEMBER 19, 1987

WELL NUMBER	TOP OF TILL ELEVATION (A)	BOTTOM OF WELL ELEVATION (B)	DEPTH OF SUMP (C)	TOP OF CT ELEVATION (PROBE) (D)	CORRECTED CT THICKNESS-PROBE (D-A)	CT THICKNESS MEASUREMENT (BAILER) (F)	CORRECTED CT THICKNESS-BAILER (F-C)
N-1	637.83	637.49	.34	638.56	.73	.8	.46
N-2	635.73	635.40	.33	637.60	1.87	2.0	1.67
N-3	639.02	638.77	.25	NOT DETECTED	NOT DETECTED	NOT DETECTED	NOT DETECTED
N-4	637.80	637.47	.33	639.44	1.64	2.8	2.47
N-5	636.50	636.25	.25	640.55	4.05	2.7	2.45
N-6	637.73	637.42	.31	NOT DETECTED	NOT DETECTED	NOT DETECTED	NOT DETECTED
N-7	639.56	639.27	.29	NOT DETECTED	NOT DETECTED	NOT DETECTED	NOT DETECTED

Since the bailer has a greater diameter than the probe, it creates a greater disturbance of fluids in the well. The effect is similar to that of a piston, driving fluid from the well while causing a temporary decrease of hydraulic head in the well. The piston effect is seen in early-time slug test data. The magnitude of the effect is partially determined by the ratio of cross-sectional area of the bailer to that of the well. Other factors include the permeability of the screened zone and the rate of bailer descent. The piston effect is especially prevalent when the permeability of the screened zone is relatively high, allowing fluid to be driven from the well. In this case CT would be driven out, resulting in a low reading.

The piston effect is partially negated by the displacement of the bailer itself. A 3-foot, 1 5/8 O.D. bailer displaces 0.055 gallons. In a 2-inch I.D. well this is equivalent to a fluid rise of 0.34 feet. With no piston effect, a bailer completely immersed in CT would produce a thickness measurement which is excessive by that amount. In practice, the apparent thickness found with a bailer depends on the relative strengths of the piston effect and bailer displacement. This, in turn, depends on the permeability of the screened zone.

Finally, it should be noted that check valves in bailers are notoriously imperfect, allowing fluid to be released while the bailer is being raised to the surface, and while thickness measurements are being made at the surface.

The degree to which a well penetrates the CT mass can also affect the accuracy of thickness measurements, as in the case of well W-21C. Monitoring well W-21C is located between the tracks near recovery well no. 2. It has a five foot screen extending from depths of 12.8 to 17.8 feet below ground surface. The well had sediment in it to a depth of 16.11 feet, which coincides with the top of the clay layer as determined by interpolation between N-Series monitoring wells. The CT thickness in this well was measured to be 6.42 feet by the probe method on 13 October 1987. Correspondingly, the top of the carbon tetrachloride in the well was approximately 3 feet above the top of the screen. The water level in W-21C was anomalously low by about 1 1/2 feet. This suggests that the thickness of CT in the well is greater than that in the surrounding aquifer, assuming a balance of static head inside and outside of the well. This is illustrated in Figure E-1 (Appendix E). By estimating the water table level in the aquifer at this location, and knowing the thickness of fluids inside the well, the thickness of carbon tetrachloride outside of the well is estimated on 13 October to be 4.0 feet. The analysis is discussed in Appendix E. Using the same approach, the thickness is calculated to have been 2.76 feet on 19 November 1987 based on probe data.

4.2 CT OCCURRENCE AND MOBILITY

It appears that the largest portion of subsurface free-phase CT occurs in the sand lenses which have been documented in four N-Series wells. Upon entering the silt layer at the surface, free-phase CT has descended through the silt due to its relatively high density. Physically, the situation is analogous to the infiltration of water in an unsaturated sediment; however, in this case free-phase CT descends through a medium which is variably saturated with air and water. As in the case of a 2-phase system (air and water) much of the free-phase CT is retained in the sediment by capillary action, both above and below the water table. Downward migration of CT is enhanced by secondary permeability in the silt. Upon encountering a relatively high permeability zone, such as a sand lens, the free-phase CT flows laterally to the edges of the lens. The flow of CT in a lens depends on the hydraulic conductivity, slope of the base of the lens, and degree of CT saturation.

A close correlation can be seen between the occurrence of CT in N-Series monitoring wells and the occurrence of sand lenses. Table 4-2 summarizes sand lens thicknesses and adjusted CT thickness for the N-Series wells. The most notable finding from this comparison is that free-phase CT was only observed in N-Series wells where there is a sand lens. Wells N-3, N-6 and N-7 did not have a sand lens or any measurable thickness of free-phase CT. A rough correlation exists between sand lens thickness and CT thickness in wells N-1 and N-2, whereas CT thickness was consistently greater than sand lens thickness in wells N-4 and N-5.

The relationship between sand less thickness and CT thickness in monitoring wells is affected by several factors. First, there is a sharp reduction of hydraulic head (pressure) in the wells when they are pumped during development. Immediately following this, CT re-enters the well through the sand lens, and water re-enters the well through the silt. The rate at which each fluid enters is a function of the permeabilities and thicknesses of the sand lens and silt. When the permeability of the sand lens exceeds that of the silt, the proportional rate of CT influx will exceed the proportional thickness of the sand lens. Therefore, the apparent CT thickness in the well exceeds the actual thickness in the sand lens. Equilibrium is maintained by fluid static conditions acting inside and outside of the well. The effect is similar to the condition observed in well W-21C (see page 4-4 and Appendix E).

A similar relationship is seen in W-Series wells located near the tracks. Wells W-33, W-35, and W-39 all had basal sand lenses (Geraghty and Miller report, September 1979) and measurable free-phase CT. Well W-32, located about 50 feet north of the tracks, appears to be an exception as it has a basal sand lens but no CT. Well W-37 is silted up to a depth

TABLE 4-2

SAND LENS THICKNESS AND ADJUSTED CT THICKNESS
ALLIED CORPORATION, DANVILLE, ILLINOIS

Well	Sand Lens Thickness (ft.)	Adjusted CT Thickness (ft.) 13 Oct. Probe	19 Nov. Probe	19 Nov. Bailer
N-1	0.67	0.12	0.73	0.46
N-2	1.75 @ 11' 0.33 @ 16'	1.49	1.87	1.67
N-3	0	0	0	0
N-4	0.50	2.41	1.64	2.47
N-5	0.50 @ 11' 0.17 @ 15'	3.76	4.05	2.45
N-6	0	0	0	0
N-7	0	0	0	0

of about 10 feet, and so cannot be used. Some W-Series wells located around the perimeter of the plant have sand lenses but no CT (W-2, W-3, W-4, W-5). This suggests that the sand lens(es) beneath the tracks are discontinuous. Due to some uncertainty about well construction and exact stratigraphy, quantification of the CT thickness/sand lens thickness is considered unreliable for the W-Series wells.

A comparison of CT thicknesses in N-Series wells and sand lens thicknesses (Table 4-2) indicates that the major sand lenses are fully saturated with CT. However, there is no evidence to suggest that the silt is saturated over the sand lenses. Thus, an accurate estimate of the total volume of free-phase CT in the subsurface requires accurate delineation of sand lens geometry. Data from wells N-3 and N-6 indicate that the basal sand lens does not extend far south of the railroad tracks. The exact extent of the basal sand lens north of the tracks is uncertain. However, data from W-Series wells does not indicate that free-phase CT extends beyond the central plant area.

Generally, the occurrence and mobility of free-phase CT in the subsurface appears to be very closely linked with the basal sand lens which has been identified near the tracks. It is believed that free-phase CT fully saturates this lens, and that lateral flow in silt beyond the edges of the lens is minimal. The absence of CT in W-Series wells around the perimeter of the plant (even though a basal sand lens is present) suggests that the lens beneath the tracks is discontinuous. However, it may be appropriate to further define the extent of the CT-filled sand lens north and west of the observed CT mass.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

Based on activities conducted at the site and interpretation of subsurface data, the following conclusions and recommendations are set forth:

- The recovery well and monitoring well designs described in this report have succeeded in preventing the accumulation of sediment in the wells. If any additional wells are constructed, similar designs are recommended.

- As the occurrence and mobility of subsurface CT appears to be closely linked to sand lenses in the upper silt layer, extreme care must be used to document the presence and nature of such lenses. It is also recommended that temporary bench marks (stakes) be installed at each new well location to provide better elevation control during well construction.

- Split-spoon sampling has indicated that the interface between the upper silty layer and the dense till is transitional. The till layer is marked by a lower proportion of sand and greater density as indicated by standard penetration test blow counts.

- Water table levels confirm the general direction of groundwater flow observed in previous investigations. Groundwater flow in the silt layer is generally to the northwest, where it is drained by tributaries to Lick Creek. The slope of the dense till surface may also control the direction of groundwater flow in the silt.

- It is recommended that future free-phase CT thickness measurements be made with an interface probe such as that used in this investigation. Thickness measurements must account for the fact that monitoring wells penetrate into the dense till layer.

- A close correlation was observed between the presence of free-phase CT in monitoring wells and the existence of a basal sand lens at the same location. This suggests that the basal sand lens is the primary reservoir of subsurface CT, and that the likelihood of migration of free-phase CT beyond the sand lens is minimal. Further delineation of the extent of free-phase CT should concentrate on defining the extent of the basal sand lens.

- Reliable data concerning the extent of free-phase CT is lacking north of the railroad tracks and in the western part of the plant. It is recommended that several additional borings/wells be installed in these areas to obtain such data. New borings/wells should be continuously split-spoon sampled to obtain detailed stratigraphic information.

- The effectiveness of existing recovery wells should be re-evaluated in light of data obtained during this investigation. Consideration should be given to installing one or more additional recovery wells north and west of the current group of recovery wells.

WESTON

APPENDIX A

WELL LOGS

ABBREVIATIONS

HNU - Photoionization Detector

OVA - Organic Vapor Analyzer

HSA - Hollow Stem Augers

Diam. - Diameter

Inst. - Installation

*CL - Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays

*ML - Inorganic silts and very fine sands, rock flour, silty or clayey sands, or clayey silts, with slight plasticity

*SM - Silty sands, sand-silt mixtures

* Unified soil classification system; compiled by B.W. Pipkin, University of Southern California

WESTON

DRILLING LOG

WELL NUMBER: N-1 OWNER: ALLIED CHEMICAL
LOCATION: See map ADDRESS: Danville, IL
TOTAL DEPTH 15.5'
SURFACE ELEVATION: 652.5' WATER LEVEL:
DRILLING COMPANY: ETI DRILLING METHOD: 6¼ - HSA DATE DRILLED: 9-23-87
DRILLER: STEVE WONN HELPER:
LOG BY: Jim Jakubiak

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0					0-8" layer of road gravel
		LOGGED CUTTINGS			8"-3'6" Olive brown to dark brown, firm CLAY SILT/SILT CLAY, trace sand <1%, semi-dry (CL). HNu was background
					4'-9' Tannish brown, soft SILTY CLAY, semi-moist, trace pebbles, trace sand (< 5%), floury texture (ML-CL)
5'					7.5' Saturation of cuttings
					9'-11' Tannish brown, soft SILTY CLAY, trace pebbles, moist to wet.
10'		1	SS	4,4,7	~5% sand. HNu readings were background.
		2	SS	5,6,7	11' - 11'9" Yellowish brown, soft, SILT, well sorted, trace sand (< 10%), saturated, (ML).
					11'9" - 14' Tannish brown, firm SILTY SANDY CLAY, oxided, trace pebbles, mottled, 15% sand, moist to wet (CL).
		3	SS	8,14,15	14'-14'8" Grey silty, firm FINE SAND, well sorted, dry (SM)
					14'8"-15'6" Grey, silty HARD CLAY TILL, some sand <10%, some
15'		4	SS	7,8,10	rounded pebbles, semi-dry to dry, HNu was background (CL)
					END OF BORING

* A.S.T.M D1586

SHEET OF

DRILLING LOG

WELL NUMBER: N-2 OWNER: ALLIED CHEMICAL
LOCATION: See map ADDRESS: Danville, Illinois
TOTAL DEPTH 17.0'
SURFACE ELEVATION: 651.9' WATER LEVEL:
DRILLING COMPANY: ETI DRILLING METHOD: 6¼"-HSA DATE DRILLED: 9/25/87
DRILLER: STEVE WONN HELPER:
LOG BY: Jim Jakubiak

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0					0-8" Layer of road gravel
					1' Olive brown, firm SILTY CLAY, semi-moist, trace sand and pebbles, HNu readings were 2-3 units (Cl)
		LOGGED CUTTINGS			3' HNu readings were 2-3 units in auger and 1-2 units in cuttings. Soils were same as above with a higher silt content (ML-CL)
5'					
					9'4"-10'7" Olive brown, SILTY CLAY, trace sand, some pebbles, moist to wet, HNu was 50-60 units (Cl)
10'		1	SS	2 3 5	
		2	SS	5 5 7	11'10.5"-12'3" Orangish brown, medium SILTY SAND, poorly sorted, moist to wet, visible CCl_4, (SM)
		3	SS	5 9 11	12'3"-13'1" Olive brown, SILTY CLAY, trace sand, some pebbles, moist to wet, HNu was 50-70 units (CL)
					13'6"-14'10" Same soil as above, HNu was 50-70 units (CL)
15'		PUSHED SHELBY TUBE			14'10"-15'6" Grey, SILTY SANDY CLAY, some pebbles, dense, semi-dry
		4	SS	9 11 15	15'8"-16' Orangish brown, medium SILTY SAND, well sorted, saturated with CCly (SM)
					16'2"-17' Grey, silty HARD CLAY TILL, some sand 10%, some pebbles, semi-dry to dry, HNu was 40-50 units (CL)
					END OF BORING
20'					

* A.S.T.M. D1586

SHEET ___ OF ___

WESTON

DRILLING LOG

WELL NUMBER: N-3 OWNER: ALLIED CHEMICAL
LOCATION: See Map ADDRESS: Danville, IL
TOTAL DEPTH 15.0'
SURFACE ELEVATION: 652.1' WATER LEVEL:
DRILLING COMPANY: ETI DRILLING METHOD: 6¼"-HSA DATE DRILLED: 9-26-87
DRILLER: STEVE WONN HELPER:
LOG BY: Jim Jakubiak

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0					0-8" Layer of road gravel
					8"-4' Olive brown to dark brown, firm CLAY SILT/SILT CLAY, trace sand 5%, trace pebbles, semi-dry (CL). HNu was background
					4' First sample tanish brown, soft SILTY CLAY, semi-moist, trace pebbles, trace sand (5%), floury texture (ML-CL)
5'					7'6" Saturation of cuttings
					9'4.5"-10'11" Soil as above, HNu was background (ML-CL)
10'		1	SS	3 3 5	
		2	SS	5 6 7	10'5"-11'9.5" Tanish brown grading to grey SILTY CLAY, trace pebbles and sand, moist to wet, soft grading to firm (ML-CL)
		3	SS	1 5 8	12'1"-13'1" Grey SILTY CLAY, trace pebbles and sand, moist to wet (CL)
					13'1"-13'8" Grey, silty HARD CLAY TILL, some sand 10%, some pebbles, semi-dry-dry, HNu was background (CL)
		4	SS	10 14 23	13'8"-15' Till as above (CL)
15'					END OF BORING
20'					

* ASTM D1586

SHEET OF

DRILLING LOG

WELL NUMBER: N-4 OWNER: ALLIED CHEMICAL

LOCATION: See map ADDRESS: Danville, IL

TOTAL DEPTH 15.33'

SURFACE ELEVATION: 652:3' WATER LEVEL:

DRILLING COMPANY: ETI DRILLING METHOD: HSA/6¼ DATE DRILLED: 9-23-87

DRILLER: STEVE WONN HELPER:

LOG BY: Jim Jakubiak

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0					0-8" layer of road gravel
		LOGGED CUTTINGS			8"-4.5" Olive brown, firm CLAY-SILT, <1% fine-medium sub-angular, sand grains, semi-dry. (CL)
					4.5"-10'6" Tannish brown, soft SILTY CLAY with trace sand (<10%), dry, trace rounded pebbles, some black staining and oxidation. Texture of a flour like a loess (ML to CL)
5'					8.0' Saturation of cuttings
10'		1	SS	1,1,1	10'6"-11' Tannish brown, soft SILTY CLAY as above, moist to wet, obvious smell of product, HNu reads 30-50 units (CL)
		2	SS	3,5,7	11'-12'4" Tannish brown, soft SILTY CLAY as above
					13'2"-13'8" Grey SILTY CLAY, saturated (soupy) (ML)
		3	SS	5,5,20	13'8"-14'2" Orangish brown, MEDIUM SAND, mottled, well sorted saturated, HNu 50-100 units (SM)
15'		4	SS	17/6"	14'2"-15'4" Grey, HARD CLAY TILL, some sand (<15%), (CL) some rounded pebbles, obvious CCl_4 in spoon, semi-dry;
					END OF BORING HNu 50-100 units

* A.S.T.M D1586

DRILLING LOG

WELL NUMBER: N-5 OWNER: ALLIED CHEMICAL
LOCATION: See Map ADDRESS: Danville, IL
TOTAL DEPTH: 16.5'
SURFACE ELEVATION: 652.0' WATER LEVEL:
DRILLING COMPANY: ETI DRILLING METHOD: 6¼-HSA DATE DRILLED: 9/24/87
DRILLER: STEVE WONN HELPER:
LOG BY: Jim Jakubiak

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0					0-10" Layer of road gravel
					10" Medium brown to olive-green-brown, firm SILTY CLAY, trace sand and pebbles, semi-dry, trace staining near surface, (CL) HNu 2 units in augers
					LOGGED CUTTINGS
5					5' Tanish brown, soft SILTY CLAY, semi-moist, trace sand and pebbles, floury texture (ML-CL), HNu was 10-12 units in augers (plug in)
					8'6" Saturation of cuttings
					9'7"-10'6" Material as above, HNu 20-25 units, (ML-CL)
10		1	SS	2 7 10	10'6"-11' Orangish brown, fine SILTY SAND, medium dense, saturated, oily CCl_4 appearance (SM)
					12'11"-14'2" Medium brown to tanish brown, SILTY SANDY CLAY, stiff, mottled, trace pebbles, moist grading to semi-dry, HNu 50-60 units (CL)
		2	SS	3 10 11	14'2"-15'4" Dark brown to grey, SILTY SANDY CLAY, some pebbles, some sand, semi-dry, very stiff, HNu 50-70 units (CL)
15		3	SS	8 11 21	15'4"-15'6" Greyish, silty Medium SAND, well sorted, oily CCl_4 appearance, saturated (SM)
		4	SS	14 17 22	15'6"-16'6" Grey, HARD CLAY TILL, some sand (15%), some rounded pebbles, semi-dry, HNu 50-70 units, (CL)
					END OF BORING
20					

*ASTM D1586

DRILLING LOG

WELL NUMBER: N6 OWNER: Allied Chemical
LOCATION: See Map ADDRESS: Danville, IL
TOTAL DEPTH 17'8"
SURFACE ELEVATION: WATER LEVEL:
DRILLING COMPANY: ETI DRILLING METHOD: HSA/6 1/4 DATE DRILLED: 9-26-87
DRILLER: Steve Wonn HELPER:
LOG BY: Jim Jakubiak

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		Logged Cuttings			0-9'7" Olive brown to tanish brown, SILTY CLAY, loess texture, trace sand, trace pebbles (ML to CL)
					HNu at 1' - cuttings background, in auger 2-3 units
					HNu at 4' - cuttings 5-7 units, in auger 8-10 units
5					
					7' - 8' Soil moist, possible sand lense
					HNu at 9' - cuttings 10-15 units, in auger 40-50 units 9'7" Wet cuttings
10		1	ss	3 4 7	9'7" - 11'2" tanish brown, SILTY CLAY, firm, trace sand, sub angular - rounded, trace pebbles (10%) carbon tet odor, 19" recovery, HNu was 10-20 units (CL)
		2	ss	push 3 8	11'5.5" - 13' 18 recovery tanish brown, SILTY CLAY, firm, trace sand, sub angular - rounded, trace pebbles (10%) carbon tet odor, HNu was 30-50 units (CL)
		3	ss	5 9 12	13'1"-14'6" tanish brown, SILTY CLAY, oxidized, grading to a greyish, SILTY CLAY, oxidized, trace pebbles, trace sand, same textures, grading to a gray SILT with sparse pebbles at bottom of spoon, damp-moist, HNu was 10-50 units (CL)
15		4	ss	5 10 12	14'8.5"-16'0.5" gray SILTY CLAY, firm - stiff, slight oxidation trace pebbles, trace sand, damp, 16" recovery, HNu 10-20 units (CL)
		5	ss	15 24 24	16'2"-17'8" Gray, HARD CLAY TILL, same sand (< 15%) some rounded pebbles, HNu 8 units (CL)
					END OF BORING
20					

* A.S.T.M D1586

WESTON

DRILLING LOG

WELL NUMBER: N-7 OWNER: ALLIED CHEMICAL

LOCATION: See map ADDRESS: Danville, IL

TOTAL DEPTH 14.0'

SURFACE ELEVATION: 652.6' WATER LEVEL:

DRILLING COMPANY: ETI DRILLING METHOD: 6¼-HSA DATE DRILLED: 9-25-87

DRILLER: STEVE WONN HELPER:

LOG BY: Jim Jakubiak

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0					0-6" layer of road gravel
					6"-1'5" Olive brown to dark brown, firm CLAY SILT/SILTY CLAY, trace sand, moist to semi-dry (ML-CL), HNu background
		LOGGED CUTTINGS			
5					5' Tanish brown, soft SILTY CLAY, semi-moist, trace sand and pebbles, flour texture (ML-CL), HNu background
					8' Saturation of cuttings
					9'4"-10'7" Tanish brown to olive greenbrown, soft SILTY CLAY, moist to wet, trace pebbles, trace sand, (ML-CL), HNu background
10		1	SS	3 5 7	
					12'6.5"-13'.5" Mottled tanish brown, firm SILTY SANDY CLAY, moist to wet, (CL) HNu background
		2	SS	6 8 13	13'.5"-13'10.5" Grey, HARD CLAY TILL, some sand (15%), some rounded pebbles, semi-dry (CL), HNu background
15					END OF BORING
20					

WESTERN

DRILLING LOG

WELL NUMBER: Recovery Well W-11 OWNER: Allied

LOCATION: ADDRESS:

TOTAL DEPTH 16.5

SURFACE ELEVATION: WATER LEVEL:

DRILLING COMPANY: Exploration DRILLING METHOD: Hollow DATE DRILLED 9/8/87

DRILLER: J.Rich Tech. HELPER: Stem

LOG BY: Pyles

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0					0-5" Concrete
					5"-4'6" Olive brown, firm CLAY-SILT, <1% fine-med., sub-angular, sand grains, semi-dry. (CL) OVA shows 12 ppm at well head flush, and 1 ppm at breathing zone.
5					
					7'7" Mottled orange to yellow-olive-brown, SILTY-CLAY <5% sand grains, and trace of pebbles. Texture of flour like a loess.
		1	cutt-ings		9'6" Same SILTY CLAY as above. One container of cuttings taken.
10					
					9'6"-11' Yellowish-brown, liquid loess material, extremely well sorted. Occurance of sand grains, 10% fine to medium, subangular.
15		2	SPT	7 11 15	13.5'-15' Gray to black, TILL material, very dense, dry to semi-dry. Trace of gravel & med. to coarse, angular-subangular sand. Split spoon recovery of 1'4".
					OVA reading of cuttings in open air, 12-15 ppm and 200 ppm in plastic bag. Till CONTACT estimated at 13.2'
		3			Shelby tube pushed from 15' to 15.5" 5" of recovery. Sample of hard, gray, dry TILL. OVA reading of 10 ppm.

* A.S.T.M D1586

Well Construction Summary

Location or Coords: North of tanks and R.R tracks
ALLIED CHEMICAL PLANT

Elevation: Ground Level 652.5
Top of Casing (inner pipe) 655.46

Project ALLIED CHEMICAL Location DANVILLE, ILLINOIS Personnel JIM JAKUBIAK

Drilling Summary:

Total Depth 15'6"
Borehole Diameter 10.00 inches
Driller STEVE WONN (Exploration Technology)
Rig CME 850
Bit(s) 6.25" I.D. HSA - FINGER BIT
Drilling Fluid NONE
Surface Casing STEEL PROTECTIVE

Well Design:

Basis: Geologic Log X Geophysical Log ____
Casing String(s): C = Casing S = Screen

3'7.5"	0	S.U.			
0	3'7.5"	C			
3'7.5"	14' 8"	S			
14' 8"	15'6"	Plug			

Casing: C1 1-2' Section with cap, 2" Stainless Steel (304)
C2 1-5' Section, 2" Stainless Steel (304), cap is 3 3/4"
Screen: S1 2-5' Sections, 2" long Stainless Steel, continuous
S2 wrap, .006 slot
Centralizers
Filter Material yes - .45-.55mm Flint Sand from 14'8" to 2'6"
Cement Portland to surface from 2.0' surface
Other Quick gel bentonite seal from 2'6" to 2' and bentonite pellets from 3' to 2'6"

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling: 0-15'6"	9-23	1600	9-23	1800
Geophys. Logging:				
Casing: Well Inst.	9-23	1800	9-24	0800
Filter Placement:				
Cementing				
Development:	10-7	0800	10-8	1400
Other:				

Well Development:

Slow recharging well. Removed 100 gallons and water quality was good to fairly clear. No CCl_4 was visible. Developement water containerized but no need for decanting.

Comments:

-Sampled to 15'6" and bored to the same
-Placed bottom of screen flush with hard grey clay
-locked steel protective casing
-cement skirt around steel protective
-well constructed from bottom to top.

WESTON DESIGNERS CONSULTANTS

Well Construction Summary

Location or Coords: Between R.R. tracks and CCl_4 tank

ALLIED CHEMICAL PLANT

Elevation: Ground Level 651.9

Top of Casing (inner pipe) 653.50

Project ALLIED CHEMICAL Location DANVILLE, ILLINOIS Personnel JIM JAKUBIAK

Drilling Summary:

Total Depth 17.0'

Borehole Diameter 10.00"

Driller STEVE WONN (Exploration Technology)

Rig CME 850

Bit(s) 6.25" HSA - FINGER BIT

Drilling Fluid NONE

Surface Casing STEEL PROTECTIVE

Well Design:

Basis: Geologic Log X Geophysical Log ___

Casing String(s): C = Casing S = Screen

2'9½"	0	S.U	___	___	___
0	5'5"	C	___	___	___
5'5"	16'2"	S	___	___	___
16'2"	16'6"	Plug	___	___	___
___	___	___	___	___	___
___	___	___	___	___	___
___	___	___	___	___	___
___	___	___	___	___	___

Casing: C1 1-2' Section with cap, 2" Stainless Steel (304)

C2 1-5' Section, 2" Stainless Steel, continuous wrap,

Screen: S1 .006 slot

S2 ___

Centralizers ___

Filter Material Flint Sand-.45 to .55mm from 17' to 3'9"

Cement Portland and bentonite grout from seal to surface - 2'9" to 0

Other Beutonite pellets used for seal from 3'9" to 2'9"

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:				
___	9-25	1245	9-25	1505
___	___	___	___	___
___	___	___	___	___
Geophys. Logging:	___	___	___	___
Casing:				
Well Inst.	9-25	1505	9-26	0900
___	___	___	___	___
___	___	___	___	___
Filter Placement:	___	___	___	___
Cementing:	___	___	___	___
Development:	10-12	1030	10-13	1415
Other:				
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___

Well Development:

Carbon tetrachloride layer at bottom of well. Well was never dry during developement. Removed 165 gallons. Water above CCl_4 layer was clear after development.

Comments:

-Sampled and drilled to 17.0"
-Plugged bottom of hole to 16'6" and sand from 16'6" to 3'9"
-Placed bottom of screen flush with hard grey clay
-Locked steel protective casing
-Cement skirt around steel protective
-Well constructed from bottom to top

WESTON

Well N-3

Well Construction Summary

Location or Coords: Just South of Road by L6. Tank ALLIED CHEMICAL PLANT

Elevation: Ground Level 652.1

Top of Casing (inner pipe) 654.96

Project ALLIED CHEMICAL Location DANVILLE ILLINOIS Personnel JIM JAKUBIAK

Drilling Summary:

Total Depth 15.00'

Borehole Diameter 10.00 inches

Driller STEVE WONN (Exploration Technology)

Rig CME 850

Bit(s) 6.25" ID. HSA - FINGER BIT

Drilling Fluid NONE

Surface Casing STEEL PROTECTIVE

Well Design:

Basis: Geologic Log X Geophysical Log ___

Casing String(s): C = Casing S = Screen

3' 3/4"	0'	S.U.	___	___	___
0	2.0'	C	___	___	___
2.0'	13'1"	S	___	___	___
13' 1"	13'4"	Plug	___	___	___
___	___	___	___	___	___
___	___	___	___	___	___
___	___	___	___	___	___
___	___	___	___	___	___

Casing C1 1-5' Section with Cap- TOTAL LENGTH 5' 3 3/4",

C2 2" stainless steel, (304) continuous wrap, .006 slot

Screen: S1 2-5' sections with plug and connector - TOTAL LENGTH 11'4", 2" stainless steel, continuous wrap, .006 slot

Centralizers ___

Filter Material Filter sand (silica -.45 to .55mm) from 14.0' to 1'10"

Cement Portland to surface, saccrete to cement steel protective 6" to 0

Other Quick gel bentonite seal from 1'10" to 6"

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	9/26	1300	9/26	1450
Geophys. Logging:				
Casing: Well Inst.	9/26	1510	9/27	0930
Filter Placement:				
Cementing				
Development:	10/6	-	10/7	-
Other:				

Well Development:

105 Gallons removed with ½ horse centrifugal pump. Surged constantly with pvc apparatus. Water fairly clear upon final discharge

Comments:

- Sampled to 15' and bored to a depth of 14'
-Placed bottom of screen flush with hard grey till
-locked steel protective casing
-cement skirt around steel protective
-Well constructed from bottom to top

Well Construction Summary

Location or Coords: Near Recovery Well & W-11 Elevation: Ground Level 652.3

ALLIED CHEMICAL PLANT Top of Casing (inner pipe) 651.34

Project ALLIED CHEMICAL Location DANVILLE, ILLINOIS Personnel JIM JAKUBIAK

Drilling Summary:

Total Depth 15'4"

Borehole Diameter 10.00"

Driller STEVE WONN (Exploration Technology)

Rig CME 850

Bit(s) 6.25" I.D. HSA - FINGER BIT

Drilling Fluid NONE

Surface Casing STEEL - FLUSH MOUNTED

Well Design:

Basis: Geologic Log X Geophysical Log ____

Casing String(s): C = Casing S = Screen

.7"	3.7"	C	____	____	____
3'7"	14'6"	S	____	____	____
14'6"	14'10"	Plug	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____

Casing C1 1-2' SECTION, 1-1' SECTION-2" STAINLESS STEEL (304),

C2 ____

Screen: S1 2-5' SECTIONS 2" STAINLESS STEEL (304), continuous

S2 wrap .006 slot

Centralizers ____

Filter Material Flint Sand - .45 to .55mm in size from 15'4" to 3.0'

Seal 6" bentonite seal from 3.0' to 2.5'

Other Portland and bentonite grout from 2.5' to surface around flush mount casing

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	9/23	0855	9/23	1100
Geophys. Logging:				
Casing: Well Inst.	9/23	1115	9/23	1435
Filter Placement:				
Cementing				
Development:	10/7	-	10/8	-
Other:				

Well Development:

Removed 155 gallons from the well. slow recharger, although the well never pumped dry due to the influence of CCl_4 at the base of the well. Water quality was clear to fairly clear after pumping

Comments:

-Flush Mounted with Steel Protective watertight cap in cement

-Drilled and sampled to 14'10"

-Well constructed from bottom of boring to surface

-Placed bottom of screen flush with hard gray clay at 14'6"

WESTON

Well Construction Summary

Location or Coords: Near converging R.R. tracks
ALLIED CHEMICAL PLANT

Elevation: Ground Level 652.0
Top of Casing (inner pipe) 651.15

Project ALLIED CHEMICAL
Location DANVILLE, ILLINOIS
Personnel JIM JAKUBIAK

Drilling Summary:

Total Depth 16'6"
Borehole Diameter 10.00"
Driller STEVE WONN (Exploration Technology)
Rig CME 850
Bit(s) 6.25" I.D. HSA - FINGER BIT
Drilling Fluid NONE
Surface Casing STEEL - FLUSH MOUNT

Well Design:

Basis: Geologic Log X Geophysical Log ___

Casing String(s): C = Casing S = Screen

FLUSH MOUNT					
.5"	4.5"	C			
4'5"	15'6"	S			
15'6"	15'9"	Plug			

Casing: C1 2-2' Sections, 2" Stainless Steel (304)
C2

Screen: S1 2-5' Sections, 2" Stainless Steel (304), contiuous wrap, .006 slot
S2

Centralizers

Filter Material Flint sand - .45 to .55mm in size from 16'6" to 3.0'

Cement Portland cement mixed with powder bentonite from 2.0' to surface

Other Bentonite pellets from 3.0' to 2.0'

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	9/24	0955	9/24	1430
Geophys. Logging:				
Casing: Well Inst.	9/24	1430	9/24	1800
Filter Placement:				
Cementing:				
Development:	10/7	-	10/8	-
Other:				

Well Development:

Removed 170 gallons from the well. Slow recharger although due to the CCl_4 at the base of the well the well never pumped dry. Water quality was clear to fairly clear after pumping

Comments:

-Flush mounted with steel protective watertight cap in cement
-Drilled and sampled to 16'6"
-Placed bottom of screen flush with hard grey clay at 15'6"
-Well constructed from bottom of boring to surface

WESTON

Well N-6

Well Construction Summary

Location or Coords: Just "W" of closed pond
ALLIED CHEMICAL PLANT

Elevation: Ground Level 652.4
Top of Casing (inner pipe) 654.46

Project ALLIED CHEMICAL Location DANVILLE, ILLINOIS Personnel JIM JAKUBIAK

Drilling Summary:

Total Depth 16.0'
Borehole Diameter 10.00"
Driller STEVE WONN (Exploration Technology)
Rig CME 850
Bit(s) 6.25" I.D. HSA - FINGER BIT
Drilling Fluid NONE
Surface Casing STEEL PROTECTIVE

Well Design:

Basis: Geologic Log X Geophysical Log ___
Casing String(s): C = Casing S = Screen

2'4 3/4"	-	0	S.U	___	-	___	___
0	-	3'11"	C	___	-	___	___
3'11"	-	14'8"	S	___	-	___	___
14'8"	-	14'11 3/4	Plug	___	-	___	___
___	-	___	___	___	-	___	___
___	-	___	___	___	-	___	___
___	-	___	___	___	-	___	___
___	-	___	___	___	-	___	___

Casing: C1 1-1' Section with cap
1-5' Section, Stainless
C2 Steel (304), 2"

Screen: S1 2-5' Sections, 2" Stainless Steel, continuous wrap
S2 .006 slot

Centralizers

Filter Material Flint sand - .45 to .55 mm in size, 16.0' to 3'6"
Cement Portland and bentonite grout from 2'5" to surface
Other Bentonite pellets from 3'6" to 2'5"

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:				
___	9/26	0645	9/26	0830
___	___	___	___	___
___	___	___	___	___
Geophys Logging:	___	___	___	___
Casing:				
Well Inst.	9/26	0830	9/26	1145
___	___	___	___	___
___	___	___	___	___
Filter Placement:	___	___	___	___
Cementing	___	___	___	___
Development:	10/12	-	10/15	-
Other:				
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___

Well Development:

Removed 85 gallons from the well. Very slow recharger. Water quality was clear to fairly clear.

Comments:

- Sampled and bored to 16.0'
-Placed bottom of screen to 14'8" and flush with hard grey clay
- Locked steel protective casing
- Cement skirt around steel protective
- Well constructed from bottom of boring to top.

WESTON

Well N-7

Well Construction Summary

Location or Coords: Far "E" end of site between closed pond and R.R. tracks
ALLIED CHEMICAL PLANT

Elevation: Ground Level 652.6
Top of Casing 651.40

Project Allied Chemical
Location Danville, Illinois
Personnel Jim Jakubiak

Drilling Summary:

Total Depth 14.0'
Borehole Diameter 10.00"
Driller STEVE WONN (Exploration Technology)
Rig CME 850
Bit(s) 6.25" I.D. HSA - FINGER BIT
Drilling Fluid NONE
Surface Casing STEEL - FLUSH MOUNT

Well Design:

Basis: Geologic Log X Geophysical Log

Casing String(s): C = Casing S = Screen

FLUSH MOUNT					
1'3"	2'3"	C			
2'3"	13'.5"	S			
13'.5"	13'4"	Plug			

Casing: C1 1-1' Section, 2" Stainless Steel (304)
C2

Screen: S1 2-5' Sections, continuous wrap, .006 slot, 2"
S2

Centralizers

Filter Material Flint sand - .45 to .55mm in size from 14' to 2.0'
Cement Portland cement and bentonite grout with saccrete from 2.0' to surface
Other Bentonite seal from 2.0' to 1'6"

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	9/25	0800	9/25	0900
Geophys. Logging:				
Casing: Well Inst.	9/25	0900	9/25	1000
Filter Placement:				
Cementing:				
Development:	10/7	1615	10/8	1630
Other:				

Well Development:

Removed 100 gallons from the well.
Slow recharger and well was purged dry about 45 times.
Water quality was clear when development was finished.

Comments:

-Flush mounted with steel protective watertight cap in cement
-Drilled and sampled to 14.0'
-Placed bottom of screen flush with hard grey clay at 13'.5"
-Well constructed from bottom of boring to surface

WESTON

Well W-11

Well Construction Summary

Location or Coords: Allied Corp. Danville, IL

Elevation: Ground Level

Top of Casing

Project Recovery Well Installation

Location ALLIED CORPORATION, Danville, IL

Personnel Dave Pyles

Drilling Summary:

Total Depth 16.34 ft.

Borehole Diameter 12.50 in.

Driller ETI

Rig CME 850

Bit(s) 8.25 in. I.D. HSA

Drilling Fluid Flushed with potable water.

Surface Casing -

Well Design:

Basis: Geologic Log X Geophysical Log

Casing String(s): C = Casing S = Screen

+1.08	11.42	C			
11.42	14.44	S			
14.44	16.62	C			

Casing: C1 6 in. diam. 304 stainless steel

C2

Screen: S1 6 in. diam. stainless steel .010 slot

S2

Centralizers yes

Filter Material #30 Filter Sand

Cement Portland cement

Other Quick gel bentonite concrete at surface
Bentonite pellets

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	9/9/87	1730	9/9/87	2010
Geophys. Logging:				
Casing: Well inst.	9/10/87	1300	9/10/87	1500
Filter Placement:				
Cementing:				
Development:				
Other:				

Well Development:

Surge block & pump

Comments:

2.18 ft. capped sump below screen. Soft boring floor, casing slid .28 ft. down hole, sand lifted to recover slide.

WESTON

WESTON

APPENDIX B

SEDIMENT LABORATORY DATA

FILE COPY

PATRICK ENGINEERING INC.

Engineers • Geologists • Hydrologists

346 Taft Avenue
Glen Ellyn, Illinois 60137
(312) 858-7050

September 21, 1987

Weston, Inc.
100 Corporate North, Suite 101
Route 22 and Lakeside Drive
Bannockburn, Illinois 60015

Attention: Mr. David Pyles
Project Geologist

Subject: Soil Sample Laboratory
Test Results for the Allied Corporation

Reference: PEI Project No. L126
Weston P. O. #44616

Dear Mr. Pyles:

We have completed the laboratory testing program on the thin walled tube soil sample and disturbed samples which you delivered to our office on September 10, 1987. A summary of the tests performed is as follows:

Laboratory Test	Tests Performed
Density Determination with Moisture Content	1
Washed Sieve with Hydrometer	2
Hydraulic Conductivity on Undisturbed Samples 2.9-inch Diameter Sample, K_v	1

The hydraulic conductivity test performed on Sample No. 1273-19-02 yielded the following results:

Natural Moisture Content	=	11.0%
Dry Density	=	124.0 pcf
Coefficient of Saturated Hydraulic Conductivity	=	1.2×10^{-7} cm/sec

The results of the washed sieve with hydrometer tests on the disturbed soil samples are attached. All testing was performed in accordance with the attached procedures which were verified and accepted by Weston prior to testing.

It has been a pleasure working with you on this project. Should you have any questions regarding the information contained in this report, or if we may be of further assistance, please do not hesitate to contact me.

Very truly yours,

PATRICK ENGINEERING INC.

Jeffrey C. Schuh

Jeffrey C. Schuh, P. E.
Vice President
Engineering Operations

JCS/ld

Enclosures: Particle Size Distribution Curves
Log of Shelby Tube Extruded in the Lab

ref:165/L126

LABORATORY PROCEDURES

Moisture Content

The moisture content was determined using soil cuttings obtained during preparation of the hydraulic conductivity (permeability) test specimen. Moisture contents were determined in accordance with ASTM D 2216-80.

Dry Unit Weight

The dry unit weight for hydraulic conductivity sample was determined using the moisture content (as determined above) and moist weight and volume of the samples.

Particle Size Distribution

The particle size distribution for all samples was determined in accordance with ASTM D 422-63.

Hydraulic Conductivity (Permeability) Test

The hydraulic conductivity test with back pressure saturation was performed on a thin-walled tube sample in accordance with U. S. Army Corps of Engineers' procedures as defined in Manual EM 1110-2-1906. The hydraulic conductivity coefficient was determined using a length of sample on the order of 3 inches. The sample diameter was 2.9± inches. The confining pressure used for sample consolidation was 10 psi. The pressure head across the samples was 4 psi corresponding to a hydraulic gradient across the samples of less than 40.

LOG OF SHELBY TUBE EXTRUDED IN LAB

Job No. L126

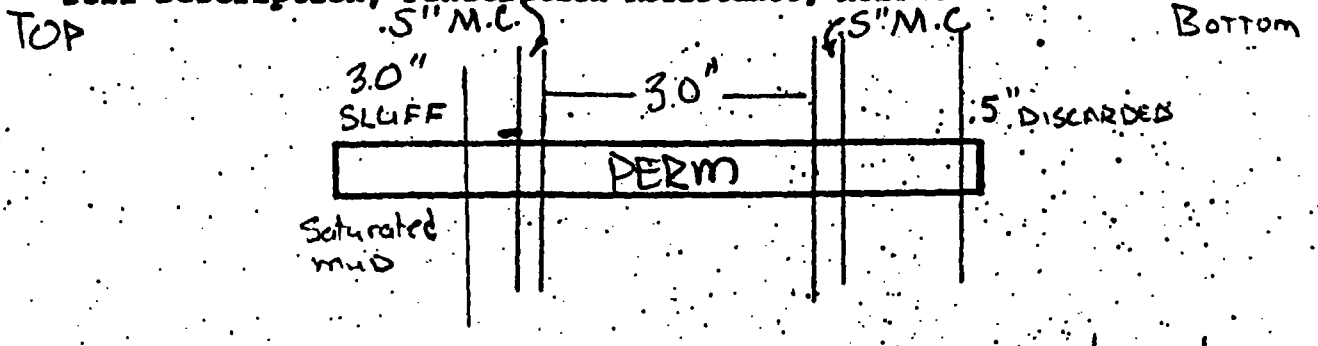
Boring No. _____ Shelby Tube No. 1273-19-01

Depth 15.5' Logged By CJM Date _____

Length of Sample After Extrusion: 8.5" Dia. 2.875

Condition of Sample: GOOD

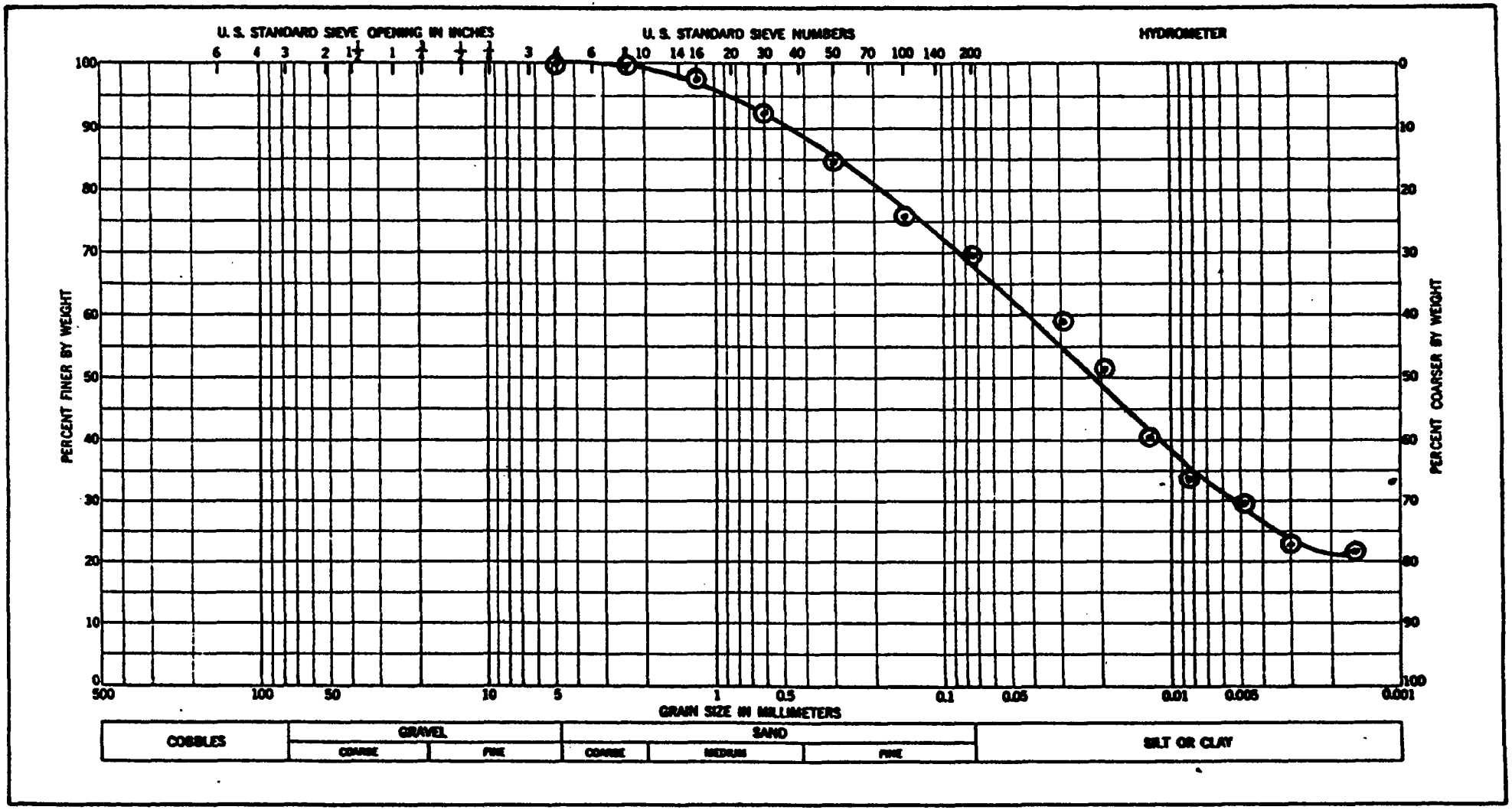
Soil Description, Penetration Resistance, Moisture Content:



Brown to dark brown silty clay, little c-f sand, sand, TR c-f gravel; hard; medium plasticity (Brittle) moist to dry. (Blocky structure) CL $Q_u = 4.5^+$

PATRICK ENGINEERING INC.

Form No. 221



Sample No.	Elev. or Depth	Classification	Nat w%	LL	PL	PI	Remarks
Jar	-	Yellow Brown Clayey Silt					

WESTON CONSULTANTS

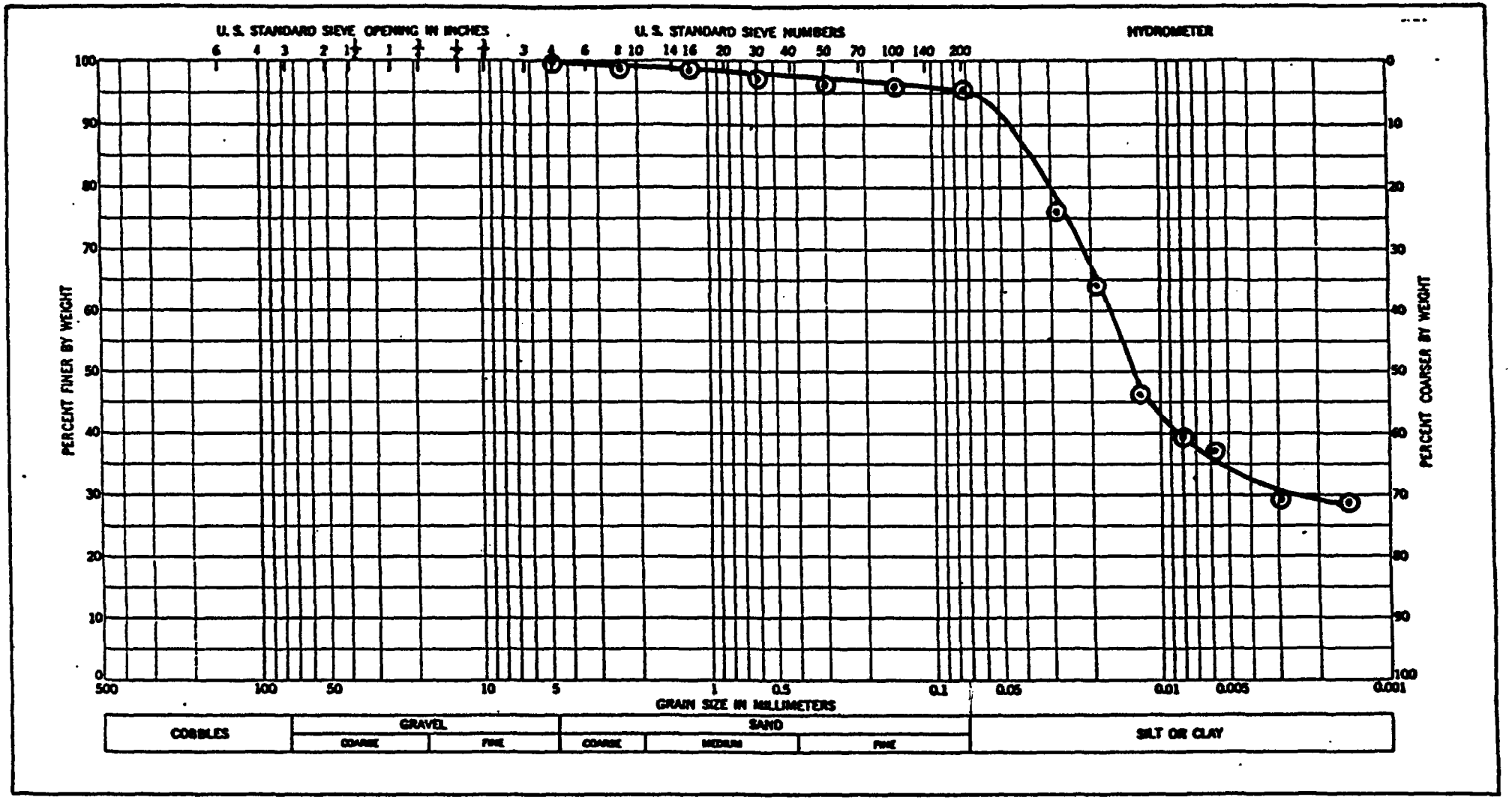
ALLIED CORPORATION

DANVILLE PROJECT

PEI PROJECT L126

PATRICK ENGINEERING INC

PARTICLE SIZE



Sample No.	Elev. or Depth	Classification	Nat w%	LL	PL	PI	Remarks
Bag	-	Yellow Brown Silty Clay					

WESTON CONSULTANTS

ALLIED CORPORATION -

DANVILLE PROJECT

PEI PROJECT L126

PATRICK ENGINEERING INC.

PARTICLE SIZE DISTRIBUTION

APPENDIX C

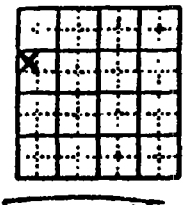
WATER-SUPPLY TEST WELL LOGS

ILLINOIS GEOLOGICAL SURVEY, URBANA

Strata	Thickness	Top	Bottom
Soft silty yellow clay		0	4
Fine sand to fine gravel, red		4	5½
Soft brown clay		5½	7
Loose silty fine to fine sand, brown, will jet		7	9
Hard sandy gray clay, gravel and pebbles embedded, used pull down		9	44
Softer sandy gray clay, gravel and pebbles embedded		44	57
Loose fine to coarse sand, small amount of fine gravel		57	59
Hard shale like blue-gray clay		59	72
Hard gray clay, gravel embedded		72	86
Soft shale-like green-blue & gray clay		86	93
Soft shale-like red-brown clay		93	98
Soft silty gray clay		98	102
Soft silty gray clay streaks blue-gray		102	109
Silty fine to fine sand		109	111
Soft dark gray clay, streaks of brown soil or till (very soft)		111	117
Veryssoft silty gray clay		117	123
Silty fine sand, tight		123	124½
Fine sand to fine gravel, tight		124½	127½
Hard light blue-gray shale		127½	138
Coal		138	145
			TD

S. S. #34401

COMPANY	Layne-Western Co. 1963
FARM	General Chemical Division NO. 1
DATE DRILLED	Allied Chem COUNTY NO. 1356
AUTHORITY	July 1959
ELEVATION	Layne-Western Co.
LOCATION	NW SW NW
COUNTY	VERMILION



12-19N-11W

2.8 f

(65000—6M—10-57)

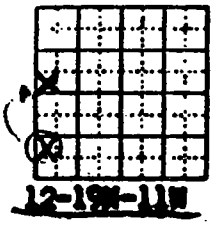
Page 1

ILLINOIS GEOLOGICAL SURVEY, URBANA

Strata	Thickness	Top	Bottom
Black soil		0	1
Soft silty light yellow-gray clay		1	4
Soft silty rusty-yellow clay		4	6
Soft silty rusty-yellow clay, thin streaks fine red sand		6	9
Hard sandy gray clay, gravel and stones		9	32
Loose fine to coarse gray sand,		32	33½
Very hard sandy clay, gray, gravel and pebbles embedded		33½	54
Loose silty fine to coarse gray sand		54	56
Very hard sandy gray clay, gravel embedded		56	65
Softer sandy grey clay, more gravelly		65	72
Hard shale like gray clay, streaks of green-blue, gravelly		72	78
Soft shale like green-blue clay, streaks of brown soil		78	83
Hard shale like dark gray clay		83	88
Hard shale like green-gray clay		88	92
Hard shale like green-gray clay streaks of yellow-brown		92	111
Soft red-brown clay, streaks of green-gray		111	115
Softer shale like brown clay		115	125
Very soft dark gray clay		125	126½
Harder dark gray clay		126½	130
Hard black shale		130	133
Coal		133	135
			TD

S. S. #34402

COMPANY Layne-Western Co.
FARM General Chem. Division, Allied Chem. 2
DATE DRILLED July 1959 COUNTY NO. 1357
AUTHORITY Layne-Western Co.
ELEVATION
LOCATION SW SW NW
COUNTY VERMILION



12-19N-11W

12.8-2

(65000—40M—10-57)

Page 1

ILLINOIS GEOLOGICAL SURVEY, URBANA

Strata	Thickness	Top	Bottom
Brown soil		0	1
Soft yellow and yellow-brown clay		1	5
Soft sandy rusty-yellow clay		5	8
Hard sandy yellow-brown clay, occasional gravel and stones embedded		8	11½
Hard sandy gray clay, gravel embedded		11½	21½
Tight fine sand to fine gravel, rusty yellow		21½	25½
Hard sandy gray clay, gravel embedded		25½	45
Tight fine sand		45	46
Hard gray clay		46	47
Loose fine to coarse sand		47	49
Hard sandy gray clay, gravel embedded		49	56
Loose fine sand to fine gravel		56	59
Soft brown clay		59	68½
Tight fine sand, small amount fine gravel		68½	70
Hard shale-like grained clay		70	71
Tight fine to coarse sand		71	72½
Soft yellow-brown clay		72½	83
Hard gray clay, gravel embedded		83	96
Softer gray clay, streaks blue-grained clay (gravel embedded)		96	107
Very soft sandy grained-gray clay		107	111
Very soft gray clay, occasional gravel embedded		111	146
Very soft gray clay gravel, lime chips pieces of shale and coal embedded		146	152
Very soft gray clay and black shaley clay		152	157
Light gray shale, hard		157	160
Thin streaks of coal in gray shale		160	162
Hard blue-gray shale		162	163

S. S. #34402

COMPANY Layne-Western Company 1963

FARM General Chemical Div.Allied Chem. NO. 3

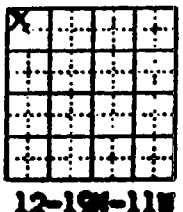
DATE DRILLED July 1959 COUNTY NO. 1358

AUTHORITY Layne-Western Co.

ELEVATION

LOCATION NW NW NW

COUNTY VERMILION



12-19N-11W

62. SR

(65600—4M—10-57)

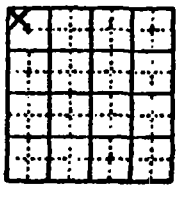
Page 1

ILLINOIS GEOLOGICAL SURVEY, URBANA

Strata	Thickness	Top	Bottom
Brown soil		0	1
Soft red clay		1	6
Harder yellow-brown clay, gravel embedded		6	11
Loose silty fine to fine sand, brown		11	14½
Hard brown clay		14½	15
Loose silty fine to coarse sand, brown		15	17
Hard sandy gray clay, gravel embedded		17	48
Loose silty fine to coarse sand		48	49
Soft yellow brown clay, thin streaks blue-gray clay, gravel embedded		49	54
Hard yellow brown clay, blue-gray clay		54	60
Loose fine sand		60	61
Hard yellow-brown clay		61	68
Soft sandy gray clay, gravel and pebbles embedded		68	85
Hard sandy gray clay, gravel & pebbles embedded		85	97
Soft blue-gray shale like clay, gravel embedded		97	108
Very soft sandy gray clay, gravel-lime chips, pieces of coal embedded		108	132
Harder shale-like blue-gray clay, gravel lime chips pieces of coal embedded		132	154
Gravel-lime chips & broken coal		154	155
Soft blue-gray shale		155	160
			TD

S. S. #34404

COMPANY Layne-Western Company
FARM General Chemical Div. Allied Chem. 4
DATE DRILLED July 1959 COUNTY NO. 1359
AUTHORITY Layne-Western Co.
ELEVATION
LOCATION NW NW NW
COUNTY VERMILION

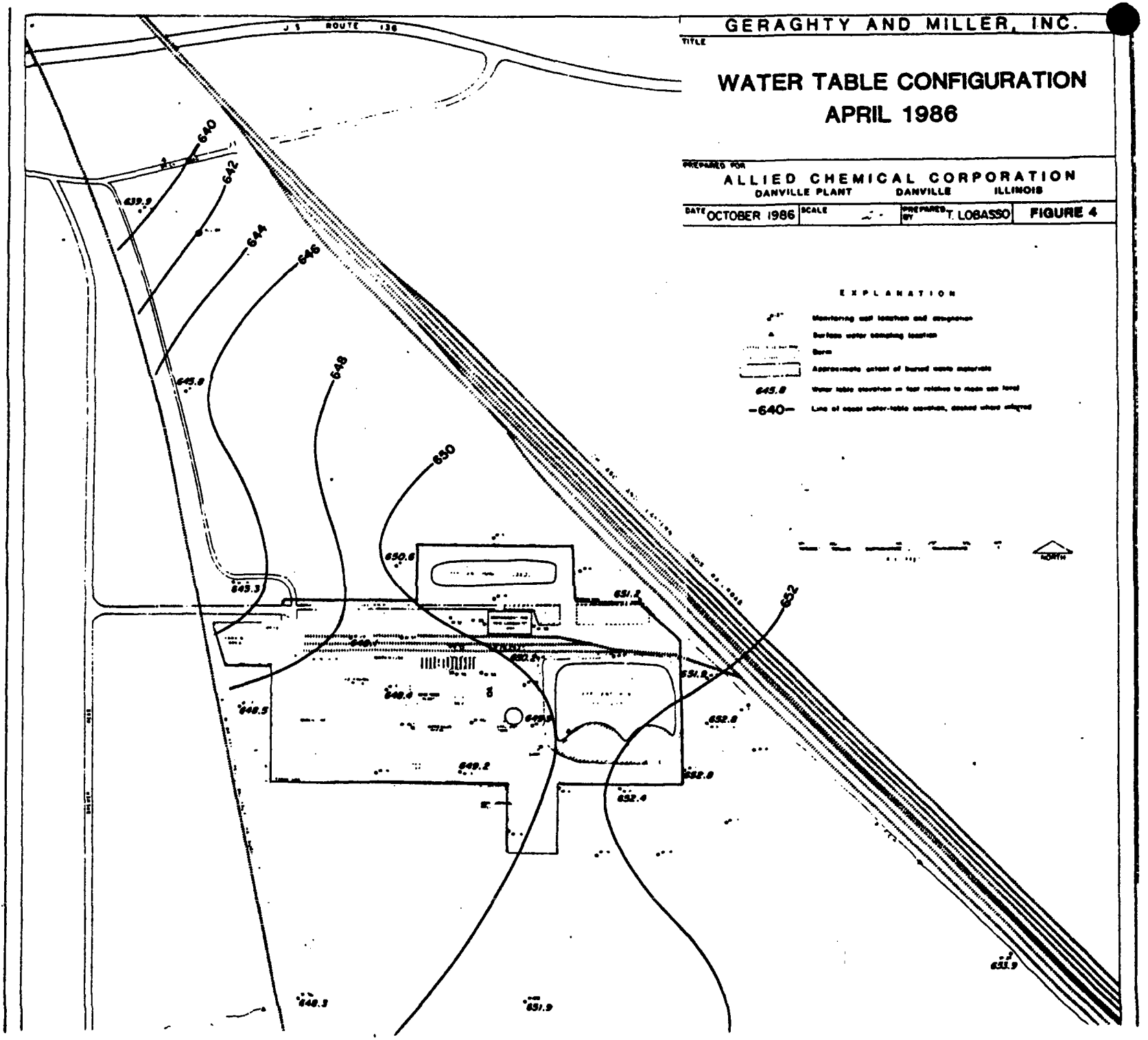


12-19N-11W

128h

APPENDIX D

GERAGHTY & MILLER WATER TABLE MAP


GERAGHTY AND MILLER, INC.
TITLE
WATER TABLE CONFIGURATION
APRIL 1986
PREPARED FOR
ALLIED CHEMICAL CORPORATION
DANVILLE PLANT DANVILLE ILLINOIS
DATE OCTOBER 1986
SCALE
PREPARED BY T. LOBASSO
FIGURE 4
EXPLANATION
645.8
-640-
NORTH
ROUTE 136
640
642
644
646
648
650
652
639.9
645.8
645.3
650.6
651.5
652.8
649.5
649.2
652.4
652.9
648.3
651.9
653.9

WESTON

APPENDIX E

WELL W-21c CT THICKNESS ANALYSIS

APPENDIX E

ESTIMATED CARBON TETRACHLORIDE THICKNESS NEAR MONITORING WELL W-21C

Due to the short screen in well W-21C,, the fluid column in this well is not believed to be representative of that in the surrounding aquifer. The situation is analogous to a U-shaped tube which contains two fluids. The tube is at equalibrium despite different fluid thicknesses and levels on either side. This equilibrium can be expressed in terms of the density and thickness of each fluid, as follows.

$$CT_A\ (d_c) + W_A\ (d_w) = CT_w\ (d_w) + W_w\ (d_w) \qquad \text{Eq. E-1}$$

Where:
- CT_A = Thickness of carbon tetrachloride in aquifer.
- CT_W = Thickness of carbon tetrachloride in well.
- W_A = Thickness of water in aquifer.
- W_W = Thickness of water in well.
- d_c = Specific gravity of carbon tetrachloride (1.59)
- d_w = Specific gravity of water (1.00).

The left side of the equation represents the fluid column in the aquifer, and the right side represents the fluid column in the well.

Given the thickness of water and carbon tetrachloride in the monitoring well (Figure 3-6), and the specific gravity of carbon tetrachloride, this equation is reduced to:

$$CT_A\ (1.59) + W_A\ (1.0) = 16.05 \qquad \text{Eq. E-2}$$

The combined thickness of carbon tetrachloride and water in the aquifer near W-21C can be estimated by interpolating between nearby wells. Using wells W-33, W-34, N-2, and N-4, all of which are within 100 feet of W-21C, the water table level in the aquifer near W-21C is estimated to be 650.04 feet by interpolation. This corresponds to a fluid column height of 13.65 feet, which can be expressed as follows:

$$CT_A + W_A = 13.65 \qquad \text{Eq. E-3}$$

$$W_A = 13.65 - CT_A \qquad \text{Eq. E-4}$$

Substituting equation E-4 into equation E-1, the thickness of carbon tetrachloride in the aquifer near W-21C is calculated to be 4.0 feet.

The only unknown in this analysis is the water table level in the aquifer near W-21C. The interpolation of this value from surrounding wells is believed to be accurate to plus or minus

0.25 feet, since the water table levels in the four surrounding wells are within 0.5 feet. Taking extreme values, aquifer fluid column heights of 13.40 feet and 13.90 feet would result in carbon tetrachloride thicknesses of 4.4 and 3.6 feet, respectively.

W-21c

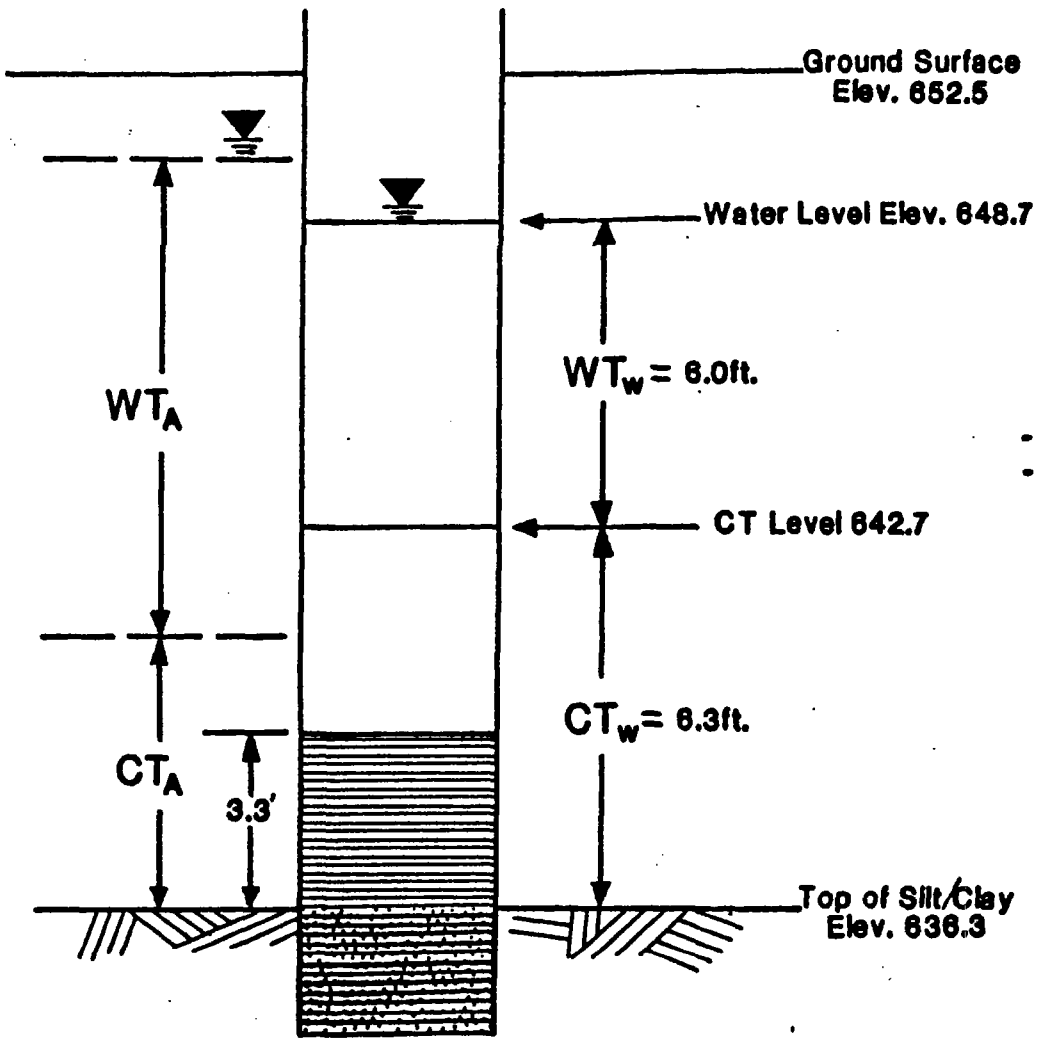


FIGURE E-1

WELL 21c

WATER LEVEL TAKEN 13 OCTOBER 1987

GROUNDWATER, CCl_4 (FREE PHASE), & BOTTOM OF WELL ELEVATIONS

ALLIED CHEMICAL, DANVILLE IL.

*RELATIVE TO TOP OF INSIDE RISER PIPE

WELL #	WATER LEVEL*	TOP OF INNER PIPE	WATER ELEV.	TOP OF CCl_4	CCl_4 ELEV.	FEET OF CCl_4	BOTTOM OF WELL	B.O.W. ELEV.	COMMENTS
N-1	6.75	655.46	648.71	17.51	637.95	0.60'	18.11		good results, developed recently
N-2	3.65	653.50	649.85	16.28	637.22	1.83'	18.11		" "
N-3	4.77	654.96	650.19	NOT DETECTED		—	16.15		" "
N-4	1.00	651.34	650.34	11.13	640.21	3.09'	14.12		" "
N-5	0.83	651.15	650.32	10.89	640.26	4.17'	15.06		" "
N-6	4.38	654.46	650.08	NOT DETECTED		—	17.14		" "
N-7	?0.30	651.40	651.10	NOT DETECTED		—	12.04		" " (might have recorded water level incorrectly in notes)
(Recovery) W-11	3.85	654.13	650.28	15.71	638.42	0.88'	16.59		" "
W-5	6.43			NOT DETECTED		—	18.12		beeper on unit stopped due to silt buildup at base of well, depth of well never encountered
W-6	6.47			NOT DETECTED		—	17.25		"
W-7	6.06			NOT DETECTED		—	19.50		"
W-12	6.31			NOT DETECTED		—	20.48		"
W-25	6.77			NOT DETECTED		—	17.80		" , some plastic white shavings on probe
W-26	6.08			NOT DETECTED		—	17.00		"
W-21A	5.12			NOT DETECTED		—	11.11		"
W-21B	5.39			slight detection at 16.15		.04'	16.49		"
W-21C	4.78	653.50	648.72	12.17	641.33	6.33'	18.50		good results, developed recently
W-31	6.05	654.39	648.34	NOT DETECTED		—	19.49		" (However, trace CCl_4 obs. during developement of well)
W-32	7.22			NOT DETECTED		—	15.50		silt buildup at base of well
W-33	5.89	655.96	650.07	20.12	635.84	0.10'	20.22		good results, developed recently
W-34	2.53	652.57	650.04	DETECTED ON PROBE, RESULTS UNCERTAIN			16.15		developed recently, however, results were not accurate due to the probe changing tones above and below a CCl_4 encountered [illegible]
W-35	2.75			14.62		4.30'	18.92		Some silt buildup at base of well
W-36	4.11			12.67		3.83'	16.50		good readings
W-37	4.29			NOT DETECTED		—	10.70		some silt build-up at base of well
W-39	7.68			16.47		1.39'	17.86		Silt buildup at base of well
W-40	6.06			NOT DETECTED		—	12.98		Some silt build-up at base of well
W-41	7.10	655.90	648.80	NOT DETECTED		—	20.00		good readings, developed recently, coarse grain sand on probe after extraction

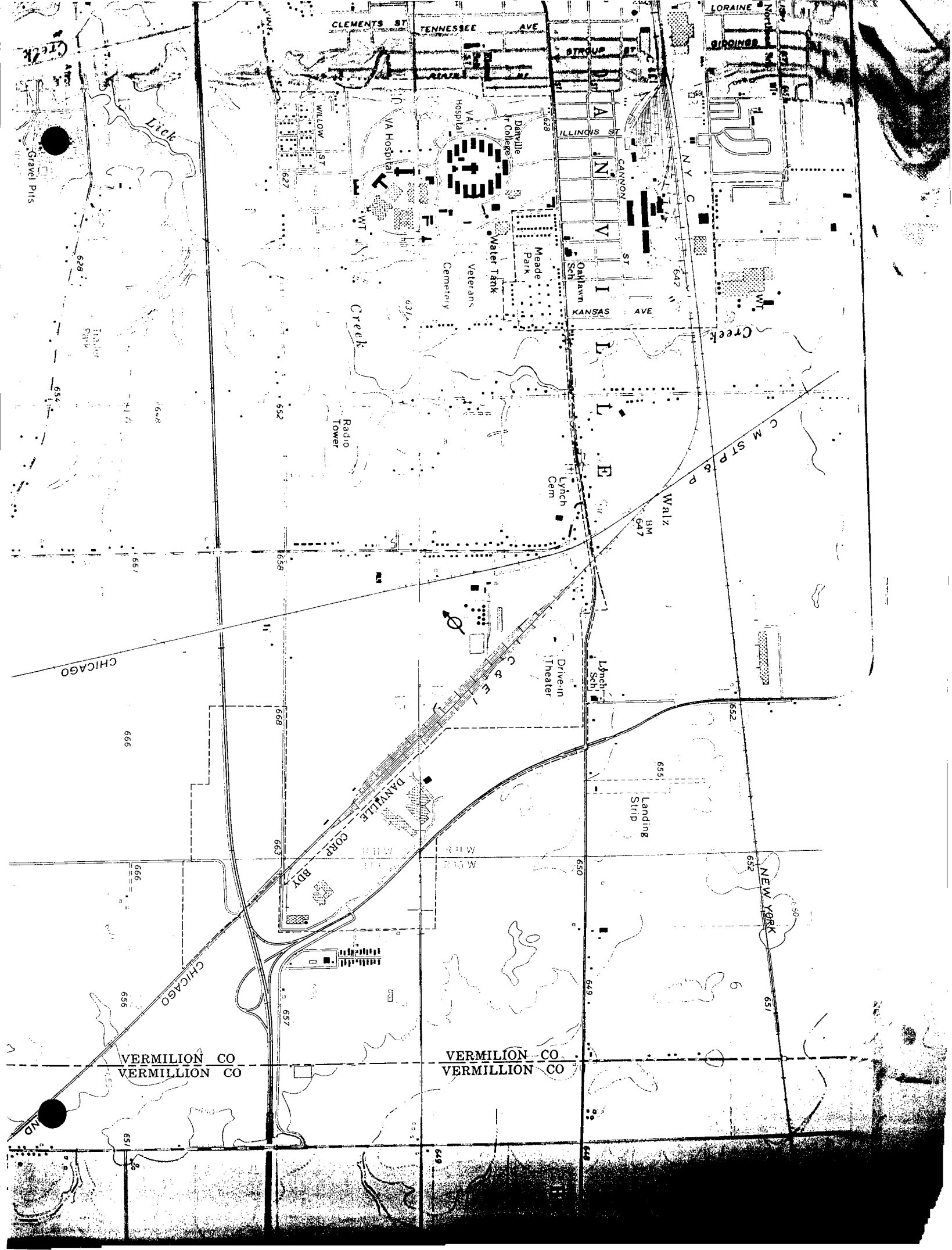
CCl_4 was on probe following extraction [illegible]

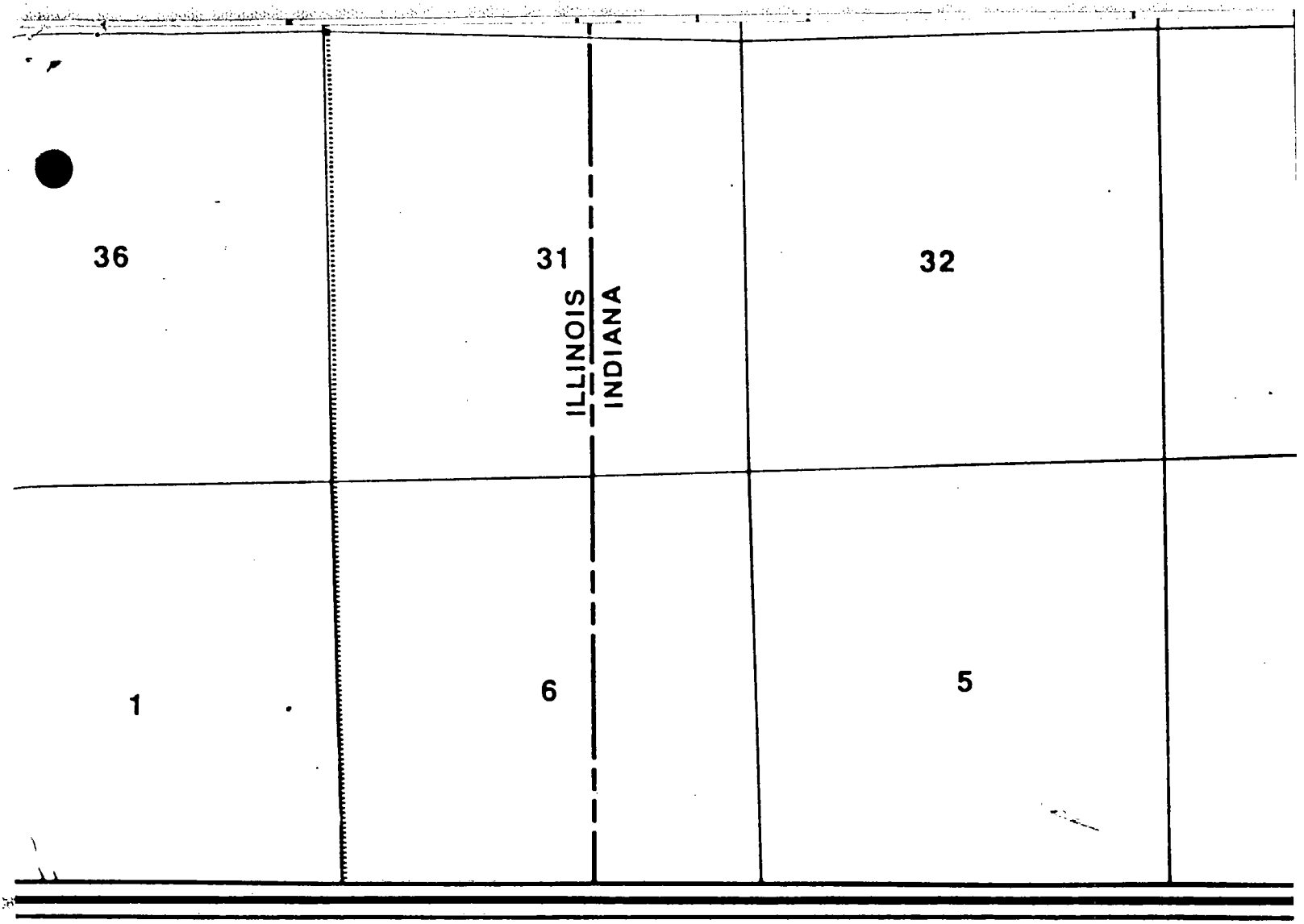
* Check developement table when looking at the presence of CCl_4

CT / G.W. MEASUREMENTS — NOVEMBER 19, 1987 — ALLIED CHEMICAL – DANVILLE, IL.

MONITOR WELL #	APPEARANCE	DEPTH TO (TOP OF CASING) WATER - PROBE	DEPTH TO BOTTOM OF WELL - PROBE	DEPTH TO CT WITH PROBE	THICKNESS OF CT IN BAILOR	OBSERVATIONS OF WELLS
N1	GOOD - SKIRT	7.20'	18.1'	16.54'	~8'	CT was a clear liquid not the normal black molasses appearance, no silt build-up, water
N2	GOOD - SKIRT	4.75'	18.1'	15.98'	~2.0'	CT was black in color, no silt build-up, silty water
N3	GOOD - SKIRT	5.47'	16.19'	NONE	NONE	NO CT just silty water
N4	GOOD - SKIRT (FLUSH)	1.78'	14.11'	11.92'	~2.75'	CT was black, no silt build-up, silty water
N5	GOOD - SKIRT (FLUSH)	1.90'	15.11'	10.60'	~2.75'	CT was emptying as bailor was pulled from well, no silt build-up just silty water
N6	GOOD - SKIRT (FLUSH)	4.79'	17.14'	NONE	NONE	SILTY WATER - NO SILT BUILD-UP
N7	GOOD - SKIRT	0.94'	12.06'	NONE	NONE	NO SILT BUILD-UP OR CT, just silty water
W-5	cement heaved	6.84'	18.12'	NONE	NOT TESTED	UNSURE OF SILT BUILD-UP
W-6	NO SKIRT	6.65'	17.32'	NONE	NOT TESTED	UNSURE OF SILT BUILD-UP
W-7	cement heaved	6.29'	19.51'	NONE	NOT TESTED	UNSURE OF SILT BUILD-UP
W-11 (COVER)	(NO COVER)	4.55'	16.60	14.96'	~2.4'	CT was BLACK IN COLOR, no apparent silt build-up, silty water
W-12	GOOD	6.57'	20.49'	NONE	NONE	SILTY WATER and APPROXIMATELY 1" at base of well
W-21A	cement heaved	6.11'	11.1'	NONE	DIDN'T TEST	APPEAR TO BE CLEAR OF SILT AT BASE
W-21B	no skirt	6.36'	16.47'	16.36'	~0.1'	CT a dark black molasses appearance, appear free of silt at base
W-21C	cement heaved	5.01'	18.50'	13.35'	~2.9'	" "
W-25	cement heaved	7.32'	~17'	NONE	NOT TESTED	MASSIVE SILT PROBLEM AT BOTTOM OF WELL, PROBE SINKS AND HAS SEDIMENT AFF
W-26	cement heaved	6.43'	17.91'	NONE	NONE	~1-2" of silt at base
W-31	NO SKIRT	6.40'	1.35'	18.60'	~1.1'	CT was black in color, silty water and possible silt build-up at base
W-32	NO SKIRT	7.75'	15.55'	NONE	NOT TESTED	very rusty inside casing, unsure as to silt build-up
W-34	NO SKIRT	3..53'	16.05'	NONE	NOT TESTED	" "
W-36	NO SKIRT	5.17'	16.55'	13.76'	~2.6'	CT was black in color, massive silt build-up at base
W-39	OK.-SKIRT	8.37'	18.85'	16.5'	NOT TESTED	very rusty inside casing, unsure as to silt build-up - some present
W-40	NO SKIRT	6.68'	13.14'	NONE	NONE	SUPER SILTY WATER, " " , PVC
W-29	HEAVED	6.55	19.05'	NONE	NONE	" " "
W-37	NO SKIRT	6.30	10.57'	NONE	NOT TESTED	NOT MUCH SILT ACCORDING TO THE FEEL OF THE PROBE
W-33	HEAVED	6.64	20.1'	20.0'	NOT TESTED	BAILOR DION'T FIT - RUSTY STICK-UP, UNSURE AS TO SILT BUILD-UP
R-1	GOOD	3.50'	17.51	NONE	NOT TESTED	DEPTH TO BOTTOM AND ALL OTHER MEASUREMENTS QUESTIONABLE DUE TO DOWNHOLE EQUIP.
R-2	GOOD	4.00'	18.7'	14.05'	NOT TESTED	WATER & CT MEASUREMENTS MAY BE OFF DUE TO PUMPING EQUIPMENT DOWNHOLE
R-5	GOOD	3.40'	20.90'	20.62	NOT TESTED	"

NOTE: MOST "W" SERIES WELLS NOT TEST WITH BAILOR WAS DUE TO THE BAILOR NOT FITTING DOWN THE WELL. MOST OF THE "W" SERIES WELLS WITH METAL RISERS ARE SEVERELY RUSTED. HOWEVER, SOME "W" SERIES WELLS WERE NOT TESTED WITH THE BAILER BECAUSE OF POSSIBLE CONTAMINATION OF CT (CROSS CONTAMINATION) INTO "CLEAN" WELLS.


CLEMENTS ST
TENNESSEE AVE
STROUP ST
LORAINE
GIRDNER
RIVER
Creek
Lick
Gravel Pits
WILLOW ST
VA Hospital
Danville Jr College
ILLINOIS ST
CANNON
N Y C
Water Tank
Meade Park
Veterans Cemetery
Oakwn Sch
KANSAS AVE
Creek
Radio Tower
Lynch Cem
C M ST P & P
Walz
BM 647
CHICAGO
C & E I
Drive-in Theater
Lynch Sch
DANVILLE CORP BDY
Landing Strip
R11W
R10W
NEW YORK
CHICAGO
VERMILION CO
VERMILLION CO
VERMILION CO
VERMILLION CO



ALLIED SIGNAL, INC.

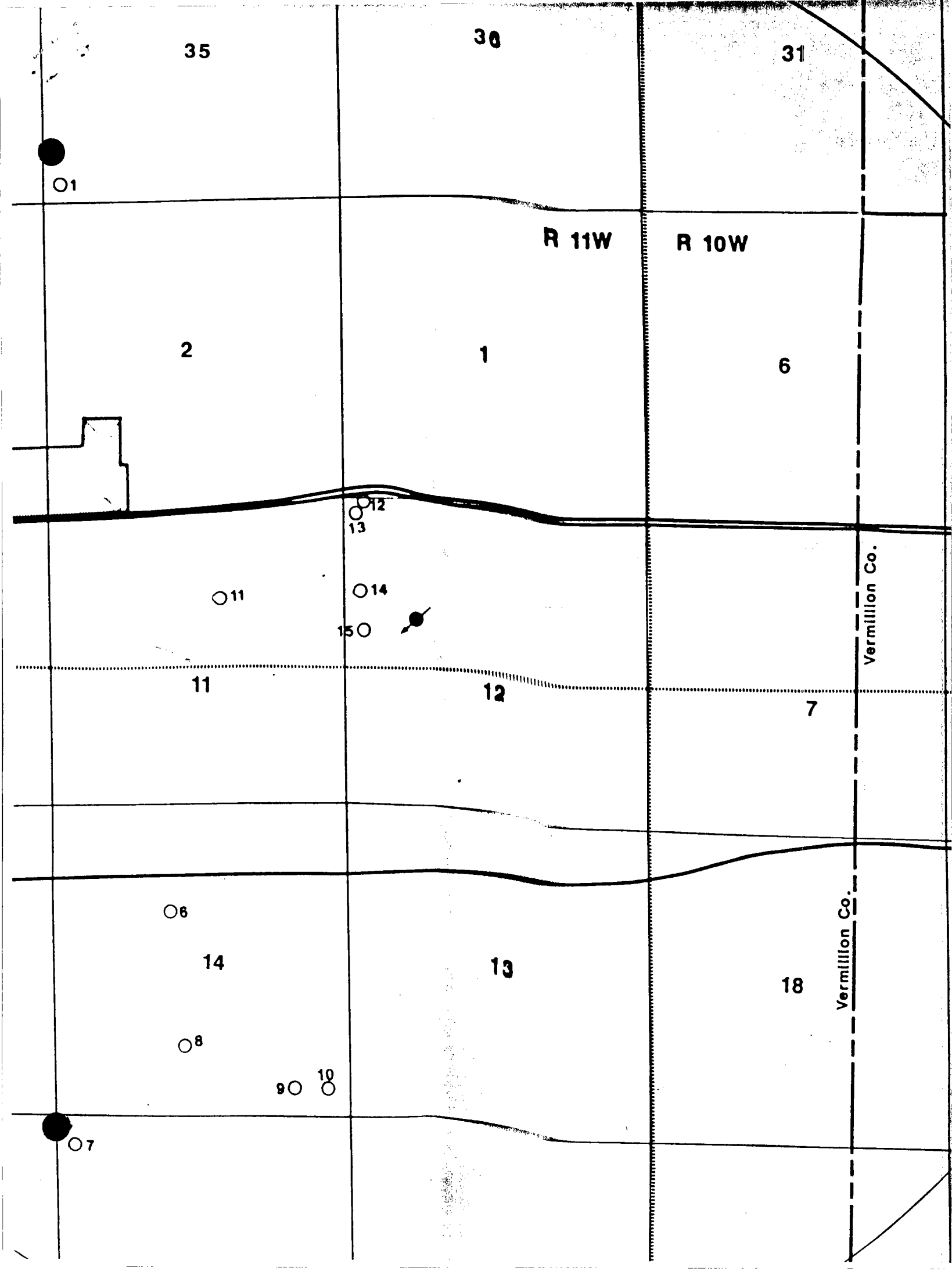
Danville, Illinois

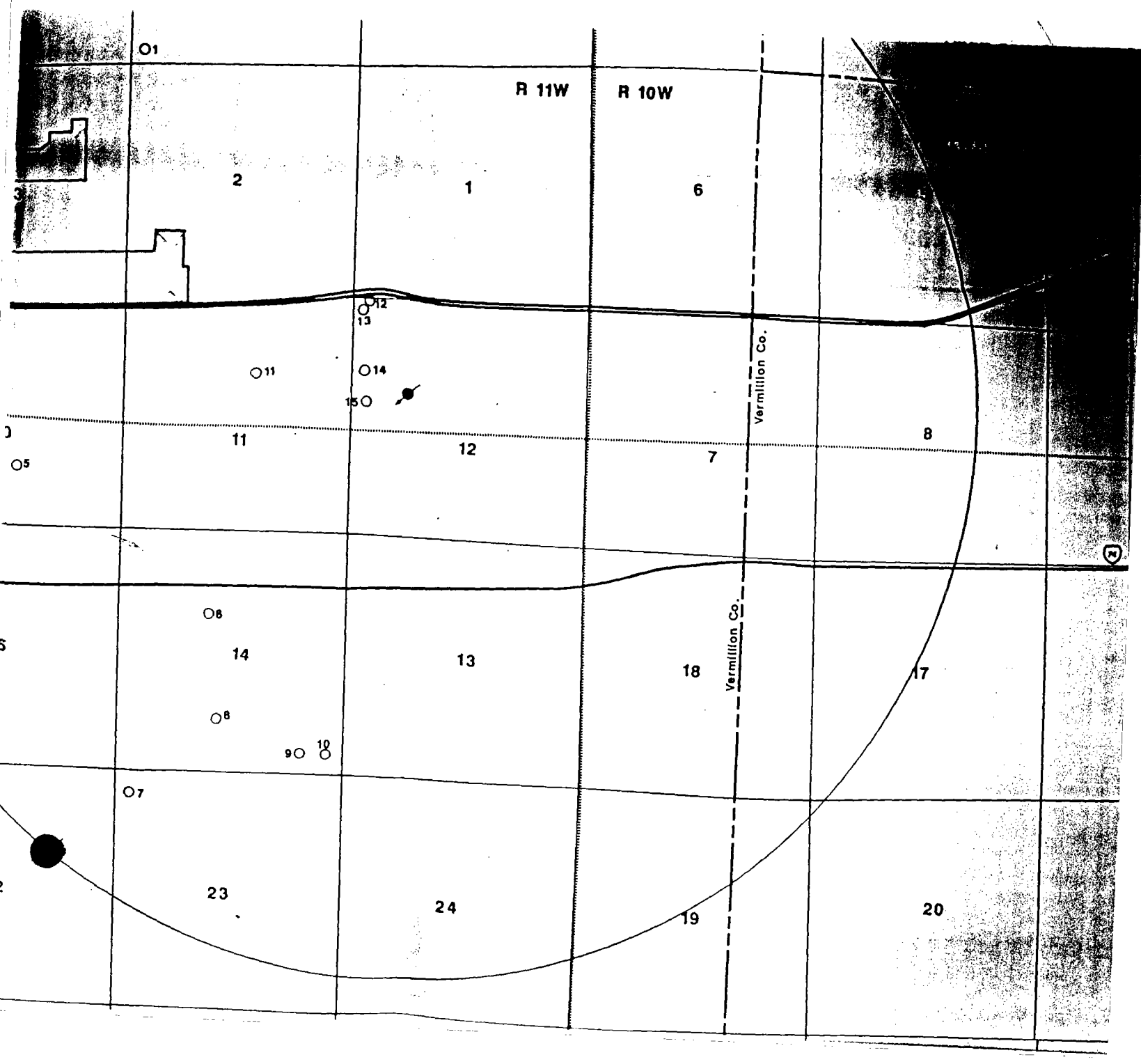
LOCATION MAP
OTHER PENETRATIONS

WITHIN A 2.5 MILE RADIUS

Appendix 4-1
Other Penetrations Location Map

Prepared by
AIC
Agency Information Consultants, Inc.
Austin, Texas


35
36
31
R 11W
R 10W
2
1
6
12
13
11
14
15
11
12
7
Vermillion Co.
6
14
13
18
Vermillion Co.
8
9
10
7


R 11W
R 10W
Vermillion Co.
Vermillion Co.
1
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3
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5
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14
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24

Appendix 4-1

OTHER PENETRATIONS WITHIN A 2.5-MILE RADIUS OF VERMILION, ILLINOIS

Map ID No.	Operator	Lease Name/Well No.	Date Drilled	Total Depth	Location
01	IL. Div. Highways	Bridge Vorhees/2	1972	35'	35-20N-11W
02	A. L. Stice	G. E. Co.	1945	130'	3-19N-11W
03	A. L. Stice	G. E. Co.	1945	290'	3-19N-11W
04	Layne-Western	Fred W. Amend/2-54	1954	90'	3-19N-11W
05	Al Winks	Vererans Admin.	1939	150'	10-19N-11W
06	Brenner Well Drlg.	Richard Shalt/1	05-20-70	130'	14-19N-11W
07	Swisker and Swank	Vermillion Hills C.C.	1960	80'	23-19N-11W
08	IL. Div. Highways	Bridge Derryville Rd/3	1972	25'	14-19N-11W
09	Brenner Well Drlg.	Beulah Spicer	09-01-76	195'	14-19N-11W
10	Brenner Well Drlg.	Russell Starks	1976	195'	14-19N-11W
11	Brenner Well Drlg.	Kenn Davis	10-28-77	215'	11-19N-11W
12	Layne-Western	Allied Chemical/4	07-59	160'	12-19N-11W
13	Layne-Western	Allied Chemical/3	07-59	163'	12-19N-11W
14	Layne-Western	Allied Chemical/1	07-59	145'	12-19N-11W
15	Layne-Western	Allied Chemical/2	07-59	135'	12-19N-11W

STATUS OF CARBON TETRACHLORIDE RECOVERY AND MONITORING AT THE ALLIED CORPORATION, DANVILLE, ILLINOIS WORKS

37
3/84

GERAGHTY & MILLER, INC.
Ground-Water Consultants

STATUS OF CARBON TETRACHLORIDE RECOVERY AND MONITORING AT THE ALLIED CORPORATION, DANVILLE, ILLINOIS WORKS

March 1987

37

Prepared by:

Geraghty & Miller, Inc.
Ground-Water Consultants
125 East Bethpage Road
Plainview, New York 11803

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TABLES

FIGURES

PLATE

SUMMARY OF CONCLUSIONS/RECOMMENDATIONS

Conclusions:

- Well restoration has improved the performance of the CT recovery wells, particulary wells R3, R4, R5, and W-11.
- Silting of screens in several monitoring wells continues to interfere with CT thickness monitoring.
- Neat CT is no longer present in well R1 and neat CT levels have declined in well R2.
- Significant quantities of neat CT are present in the formation near wells R3, R4, R5 and 11.
- Based on CT thickness measurements made in March 1986 by Allied following the completion of well restoration, the plume of neat CT appears to be limited to the central plant area.
- Ground-water affected by dissolved CT is limited to the central plant area and is coincident with the areas affected by neat CT. In fact, the plume appears to have decreased in size since it was last mapped in 1979.
- Based on the analytical results of ground-water sampling completed by Allied during April 1986, the plume of dissolved CT has not moved to any significant extent since it was last studied in 1979.

Recommendations:

- Replace recovery well W-11, a 2-inch diameter monitoring/recovery well, with a large diameter recovery well.
- Replace selected monitoring wells located in the central plant area with wells that are more resistant to silting so that CT thickness can be more accurately monitored.

- Monitor on a semi-annual basis for: dissolved CT in ground water, neat CT thicknesses, well depths, and ground-water levels in the wells studied during Allied's second quarter (April 1986) sampling survey.

- Continue CT recovery in all wells including R1 and R2 when possible. Adjust pumping rates and frequencies of each well to optimize CT recovery.

STATUS OF CARBON TETRACHLORIDE RECOVERY AND MONITORING AT THE ALLIED CORPORATION DANVILLE, ILLINOIS WORKS

INTRODUCTION

As you requested, Geraghty & Miller, Inc. has reviewed data collected by Allied Corporation from recovery and monitoring wells at the Danville, Illinois works. Allied performed a well restoration and ground-water/carbon tetrachloride (CT) monitoring program with direction from Geraghty & Miller, Inc. (letter to George Kady November 25, 1985). This program included restoration (redevelopment) of monitoring wells and CT recovery wells (R1, R2, R3, R4, R5 and W-11), neat CT thickness and elevation measurements in wells, collection and analysis of ground-water samples for CT, and water-level measurements. This report includes an assessment of the status of CT in the subsurface, based on Allied's work and previous studies completed by Geraghty & Miller, Inc., in 1979 and 1985,and also includes recommendations for additional remedial measures to expedite CT removal and a monitoring program to track the progress of the remedial process.

STATUS OF RECOVERY/MONITORING WELLS: POST-RESTORATION

The performance of Allied's CT recovery wells has improved significantly as a result of well restoration (redevelopment), based upon the comparison between CT thick-

nesses measured in March 1986, soon after wells were redeveloped and July 1986 just before CT recovery (pumping) resumed, as indicated below.

	March 1986 CT Thickness in inches	July 1986 CT Thickness in inches	September 1986 CT Thickness in inches
R1	3.9	0	0
R2	28.7	52	6
R3	32.1	103	37
R4	32.1	103	102
R5	26.3	103	42
W-11	1.0	66	66

The most productive recovery wells are R3, R4 and R5. The absence of neat CT in well R1, indicates that neat CT in the formation near the well is no longer recoverable by pumping. The amount of recoverable neat CT near well R2, is also declining, based on CT thickness measurements during 7/86 to 9/86 (52 inches to 6 inches). Areas surrounding recovery well 11 appear to have accumulated substantial quantities of CT; however, well 11 is a two-inch diameter well and therefore large quantities of CT cannot be easily removed from this well. In order to expedite CT removal, well 11 should be replaced with a large diameter recovery well, similar in construction to other onsite recovery wells. Figure 1 shows recommended well design and specifications.

Based upon measurements of well depths made by Allied approximately 7 months after the monitoring wells were restored (March 1986), some wells continue to accumulate silt

inside of the well screens. The most serious effect of the silting problem is that it interferes with measurements of neat CT thickness in the plant area. We are reasonably confident, however, of the CT thickness data that were collected in both monitoring and recovery wells by Allied in March shortly after the wells were cleared of silt.

We recommend that monitoring wells near the neat CT plume be replaced. The wells recommended for replacement are; W-10 (damaged), W-12, W-31, W-32, W-35, W-36, W-37, W-39 and W-40.

It is not always possible to install a well that is capable of yielding silt-free water, especially in the type of geologic material found at the Danville site. However, there are several ways to minimize the silting problem, they are: a) use shorter well screen lengths (10 feet as opposed to the 15 feet used in the existing wells), b) utilize a smaller well screen opening size (0.006 inches), c) increase the thickness of the sand pack in the annular space between the well screen and borehole by installing the well in an oversized hole (for example, install a 2-inch diameter well in an 8 or 10-inch diameter borehole), and D) use a sand pack with a grain size that is compatable to the well screen slot opening size.

STATUS OF NEAT CT IN THE SUBSURFACE

Results from CT thickness measurements in recovery and monitoring wells during March 1986 (post-well restoration) indicate that the plume of neat CT is limited to the central plant area. This condition is attributed to the success of Allied's recovery system and to the low permeability of the loess/glacial till formation. Figure 2 shows the approximate extent of neat CT and thicknesses measured in recovery and monitoring wells. It should be noted that measurements of CT thicknesses in wells does not exactly coincide with the thickness of this product in the formation. However, the well measurements are a good qualitative indication of neat CT in the subsurface.

STATUS OF DISSOLVED CT IN THE SUBSURFACE

The results of ground-water sampling and analyses conducted by Allied on select monitoring wells during April 1986 (second quarter sampling survey) indicate that dissolved CT is limited to areas affected by neat CT. The data is given in Table 1. The dissolved CT plume has not migrated toward the plant boundary since Geraghty & Miller, Inc.'s survey in 1979. In fact, the size of the dissolved CT plume has apparently decreased since Geraghty & Miller, Inc.'s survey. Figure 3 shows the concentrations of CT determined during Allied's second quarter 1986 survey and for

review, Plate 3 from Geraghty & Miller, Inc.'s 1979 investigation report is attached. Comparison of data on a well to well basis between 1979 and 1986 indicate an overall decline in CT concentrations except for well 12 where CT concentration increased from 2.6 ppb to 29,000 ppb.

Ground-water samples collected during the second quarter 1986 from wells outside of the central plant area show nondetectable or trace levels of CT. Analysis of these samples was split between Allied's EC Laboratory and Rocky Mountain Analytical Laboratory, and the results are considered reliable since there is a high degree of agreement between the results from the two laboratories.

Because the geologic materials underlying the site have low permeability and the hydraulic gradient is very flat, as depicted in Figure 4, we expect movement of the CT plume to be extremely slow. Nevertheless, ground-water quality, ground-water elevations, and carbon tetrachloride thicknesses (recovery and monitoring wells) should continue to be monitored at least on a semi-annual basis.

To date more than 8,700 gallons of CT have been removed from the subsurface by the recovery well network. The rates of recovery have declined steadily since 1981 in each of the wells. This decreasing trend in product recovery is common in recovery operations due to natural retention of the

residual product by the soil grains once the bulk of the product has been removed. This condition is further amplified in Allied's case because the soils are extremely fine grained and exhibit a high fluid-retention capacity. The decline in CT recovery rates via pumping is expected to continue in to the future. If Allied continues to utilize the recovery wells a carefully planned schedule of intermittant pumping should be instituted to optimize CT recovery.

Sincerely,

GERAGHTY & MILLER, INC.

Thomas Lobasso
Senior Scientist

Michael F. Wolfert
Associate

TL/MFW:dv

Table 1: Second Quarter (April 1986) Results of CT Analyses in Ground Water

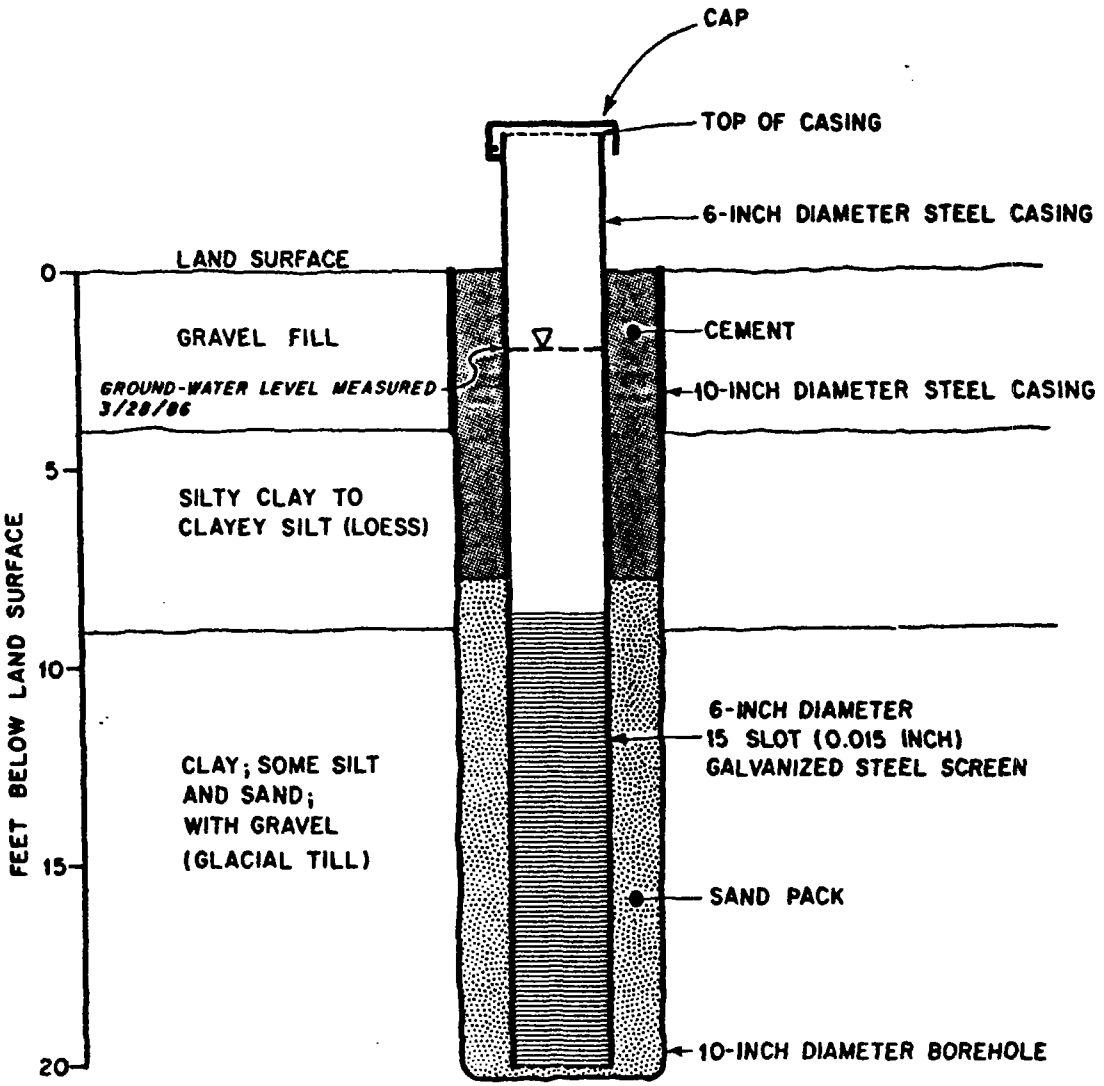
WELL	UNITS	ROCKY MOUNTAIN ANALYT'L	D/L	ALLIEDS'S ECL	D/L
1	ug/l	49	6	38	5
2	ug/l	ND	3	ND	5
5	ug/l	ND	3	ND	5
6	ug/l	ND	3	ND	5
7	ug/l	ND	3	ND	5
8	ug/l	ND	3	ND	5
10	ug/l	ND	5	ND	5
12	ug/l	29000	10000	43000	5
13	ug/l	ND	6	ND	5
20	ug/l	13.1	3	12	5
22	ug/l	ND	3	not analyzed	5
23	ug/l	ND	3	ND	5
24	ug/l	ND	3	ND	5
27	ug/l	5.4	3	ND	5
28	ug/l	ND	5	ND	5
29	ug/l	ND	3	ND	5
30	ug/l	ND	3	ND	5
31	ug/l	210000	60000	325000	5

D/L - detection limits

UG/L - microgram per liter or parts per billion

ND - not detected

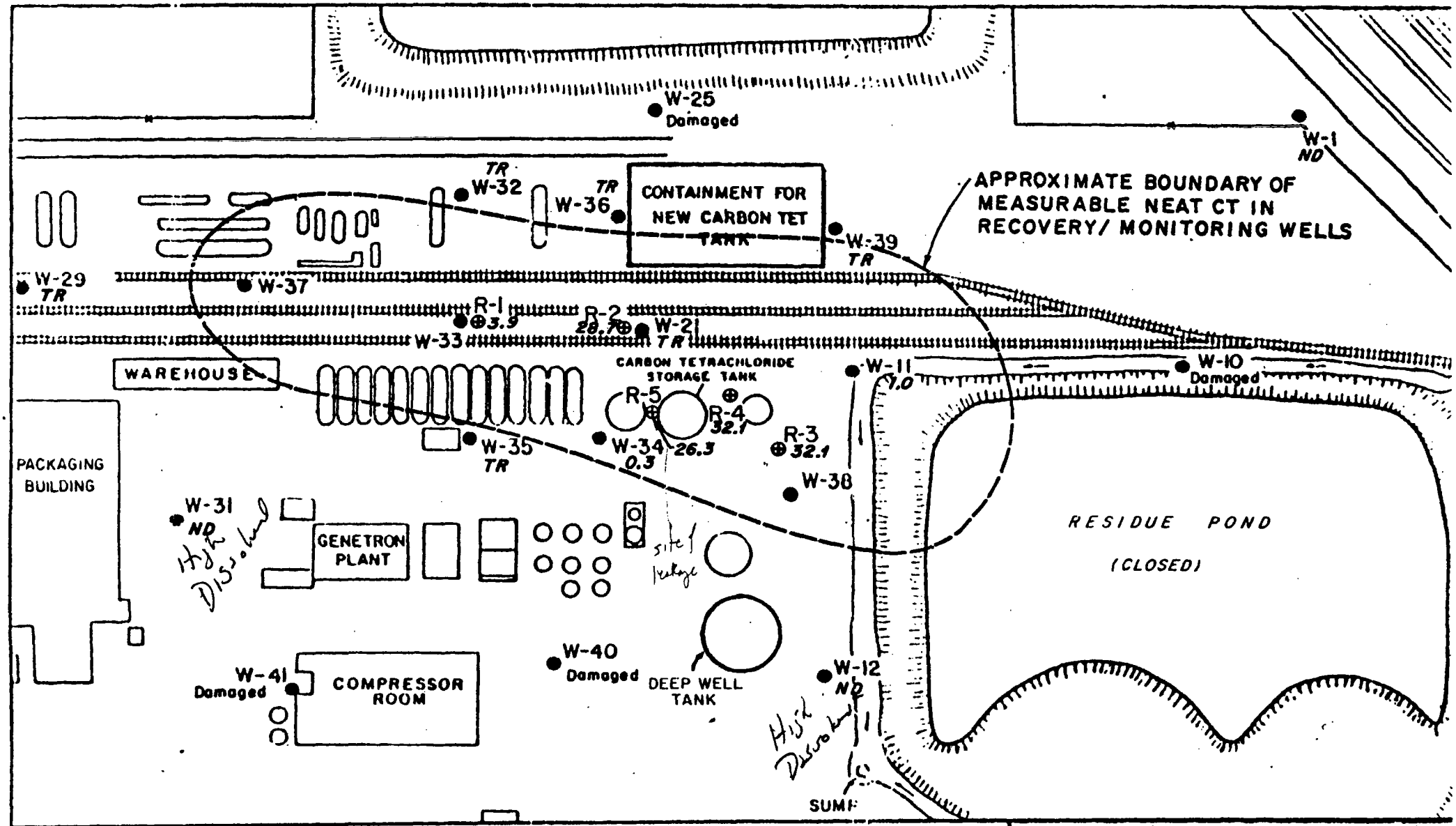
GERAGHTY & MILLER, INC.
Ground-Water Consultants



GERAGHTY & MILLER INC.
RECOMMENDED RECOVERY WELL DESIGN

ALLIED CHEMICAL CORPORATION
DANVILLE PLANT DANVILLE, ILLINOIS

FIGURE 1



EXPLANATION

- W-34 / 26.3 — MONITORING WELL LOCATION, DESIGNATION, AND THICKNESS OF CT IN INCHES IN WELL CASING
- R-1 / 3.9 — RECOVERY WELL LOCATION, DESIGNATION, AND THICKNESS OF CT IN INCHES IN WELL CASING
- TR — TRACE OF CT
- ND — CT NOT DETECTED

0 — 100 feet

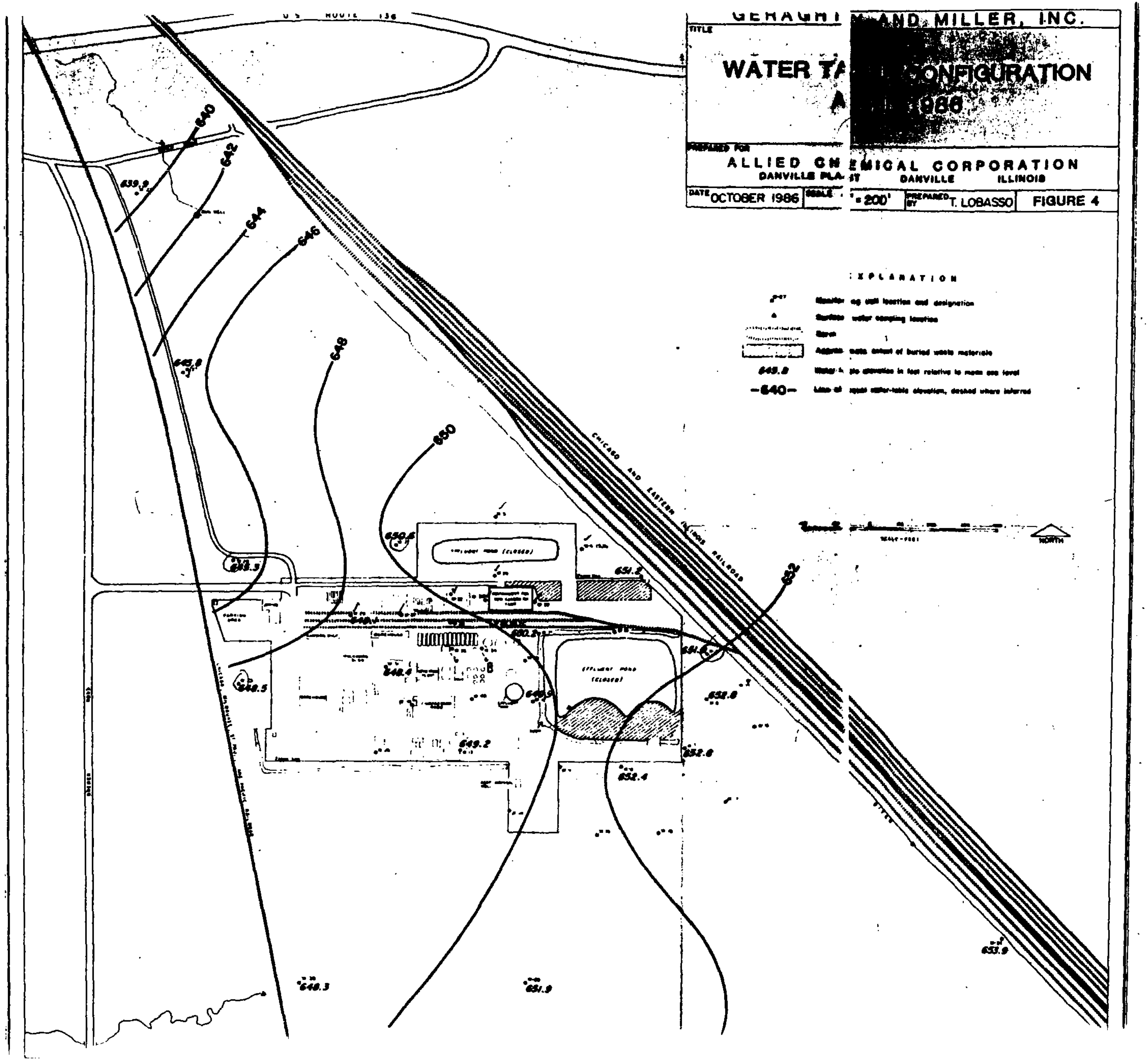
NORTH

GERAGHTY & MILLER, INC.

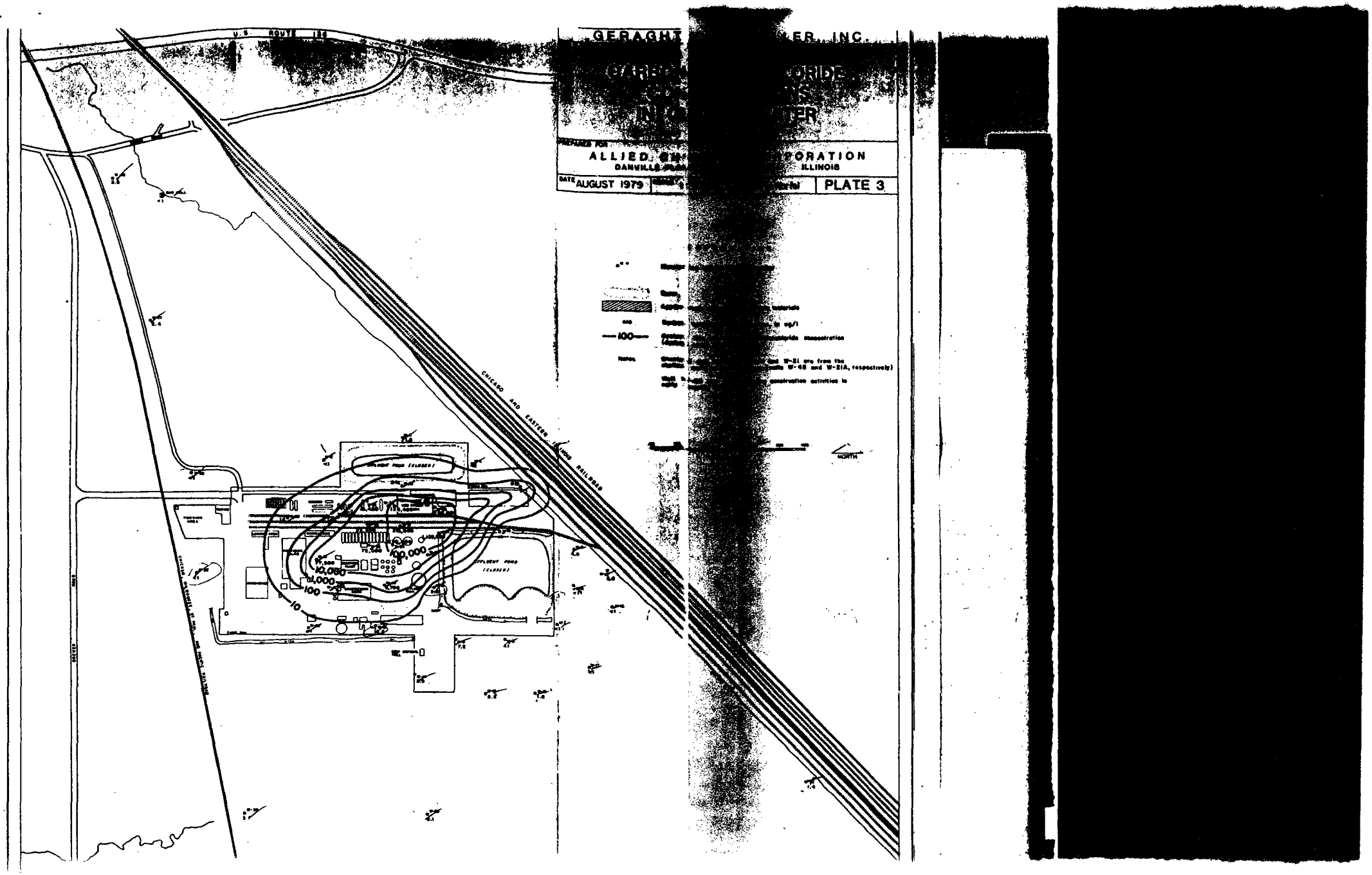
TITLE
THICKNESS OF NEAT CARBON TETRACHLORIDE (CT) IN RECOVERY AND MONITORING WELLS MARCH 1986

PREPARED FOR
ALLIED CHEMICAL CORPORATION
DANVILLE PLANT DANVILLE ILLINOIS

DATE	SCALE		FIGURE
11-86	AS SHOWN		



GERAGHT[redacted]AND MILLER, INC.
TITLE
WATER TA[redacted]CONFIGURATION
A[redacted]1986
PREPARED FOR
ALLIED CH[redacted]EMICAL CORPORATION
DANVILLE PLA[redacted]T DANVILLE ILLINOIS
DATE OCTOBER 1986
SCALE [redacted]= 200'
PREPARED BY T. LOBASSO
FIGURE 4
EXPLANATION
-640-
U.S. ROUTE 136
CHICAGO AND EASTERN ILLINOIS RAILROAD
EFFLUENT POND (CLOSED)
NORTH
640
642
644
646
648
650
652
639.9
645.8
650.6
651.2
652.8
652.6
652.4
648.4
649.2
648.5
648.3
651.9
653.9

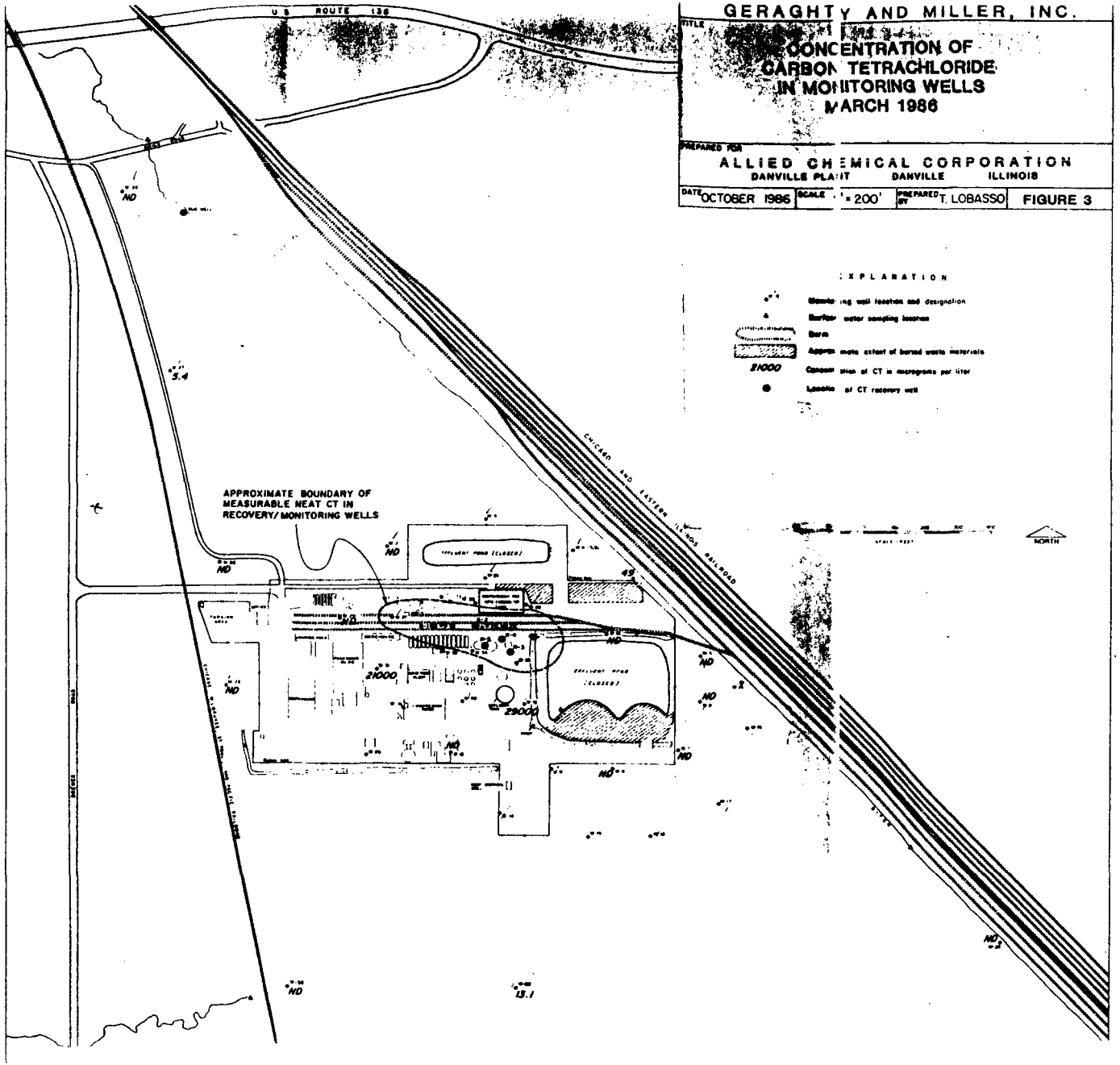


GERAGHT ER, INC.

ORIDE
S
ER

ALLIED
DANVILLE
ORATION
ILLINOIS

DATE AUGUST 1979 | PLATE 3


GERAGHTY AND MILLER, INC.
TITLE
CONCENTRATION OF
CARBON TETRACHLORIDE
IN MONITORING WELLS
MARCH 1986
PREPARED FOR
ALLIED CHEMICAL CORPORATION
DANVILLE PLANT DANVILLE ILLINOIS
DATE OCTOBER 1986 SCALE 1" = 200' PREPARED BY T. LOBASSO FIGURE 3
EXPLANATION
Monitoring well location and designation
Surface water sampling location
Berm
Approximate extent of buried waste materials
21000 Concentration of CT in micrograms per liter
Location of CT recovery well
APPROXIMATE BOUNDARY OF MEASURABLE NEAT CT IN RECOVERY/MONITORING WELLS
NORTH
U.S. ROUTE 136
CHICAGO AND EASTERN ILLINOIS RAILROAD
ND
5.4
21000
29000
13.1

UIC Filing
Blue Folder

Allied Chemical

Chemicals Company
P.O. Box 13
Danville, Illinois 61832
(217) 446-4700

December 23, 1980

Illinois Environmental Protection Agency
Division of Land/Noise Pollution Control
Groundwater Management Control
2200 Churchill Road
Springfield, Illinois 62706

Subject: Industrial Waste Disposal Well
Permit No. 1980-UIC-2-OP-1
Allied Chemical Corporation
Danville Works

Dear Sir:

The November Operational Report for the subject disposal well is attached. This report includes all data and information required to be submitted. Also included is the report from Robinson Engineering with the results of the radioactive tracer survey and pressure test conducted on Oct. 22.

On Nov. 17, the 400,000 gal. waste holding tank was taken out of service for inspection. Approximately 50% of the ceiling and 45 degrees of the tank sidewall area on either side of the liquid inlet nozzle has been damaged with thin, wrinkled pieces of rubber falling off. Approximately 2 plys of the original 6 ply rubber thickness has been affected. Durometer tests indicated the remaining rubber is in good condition and electric spark tests showed there were no pinhole leaks. However, several previously patched areas on the tank floor exhibit softening of the rubber and will require repairs before the tank can be returned to service. Repairs are expected to be completed by Jan. 15, 1981.

There were no operational problems encountered during the month.

If you have any questions, please telephone me.

Very truly yours,
W. C. A. Schrader for KJH
W. C. A. Schrader
Plant Manager

WCAS/kjh

cc: Illinois State Water Survey
P.O. Box 232
Urbana, Illinois 61801

Illinois State Geological Survey
Natural Resources Building
University of Illinois
Urbana, Illinois 61801

20

Attachments:

RECEIVED
DEC 24 1980
E.P.A. — D.L.P.C.
STATE OF ILLINOIS

Allied Chemical Corp.
Danville Works
Deep Waste Disposal Well

November, 1980

Summary of Operations:

1. Samples of injected waste were collected every eight hours of injection time and composited each week. Analysis of weekly composites were:

Week Ending	11-10	11-17	11-24	12-1
pH	1.08	12.24	1.44	2.24
Specific gravity	1.038	1.010	1.017	1.005
Sample temperature, °F	77	70	67	61
% HCl	6.72	<.01	2.70	.34
% HF	<.01	<.01	<.01	.04
Inorganic chlorides, ppm	252	2277	474	785
Inorganic salts (NaF) ppm	1543	5200	1250	1205
Organic material (TOC) ppm	8.7	26.5	6.8	19.2
Free chlorine, ppm	10.3	NIL	NIL	NIL
Suspended solids, ppm	18	484	40	12
Nickel, ppm	0.24	1.32	0.46	0.28

2. Viscosity of the weekly sample, 11-3 to 11-10, was .5816 cp at 100°F.

3. Oil volume in the annulus remained unchanged.

4. Null conductivity reading was 15.5 Micromhos.

5. Thirty gallons of kerosene was added to the annulus on 10-31.

6. Attached is a list of operating data obtained during the month.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

MEMORANDUM

CE1

DATE: June 21, 1984

TO: Division File

FROM: DCJ David C. Jansen, DLPC/FOS - Central Region

SUBJECT: LPC #18380427 - Vermilion County
Danville/Allied Chemical
ILD #005463344

Allied Chemical manufactures and packages refrigerant and aerosol propellant gases. Hydrochloric acid is generated as a by-product of the manufacturing process. The acid is sold, and/or disposed of in an on-site deepwell. Also disposed in the deepwell are off-spec. acid, contaminated runoff from the process areas, boiler and cooling tower blowdowns, air pollution control scrubber acids, sodium hydroxide, and until May 1984, carbon tetrachloride pumped from six carbon tetrachloride recovery wells. Quantities of wastes injected into the deep well are reported to the IEPA monthly. In May of 1984, 2,548,550 gallons of waste were injected.

Prior to disposal in the deep well, the waste is stored in tanks #33 and 34 (21,000 gallon capacity each) and tank #40 (420,000 gallon capacity). In addition to serving as a backup to tanks #33 and 34, tank #40 is used to store contaminated runoff pumped from the waste collection sump (see photo #16). Mr. Kady said runoff is collected first in the sump and then pumped into tank #40 before disposal in the deepwell. In the inspection report of 9/20/83, it was incorrectly reported that wastes were routed through the sump just before deepwell injection.

According to Mr. Kady, the facility is currently generating acid waste (D002), carbon tetrachloride (U211), and sulfuric acid demister waste (D002, D004 - E.P. Toxicity arsenic 105 ppm).

The carbon tetrachloride waste is generated from the recovery of spilled carbon tetrachloride from six wells (See 9/20/83 report for more detail). The disposal of this solvent in the deepwell was discontinued in May 1984. Mr. Kady said Allied will recycle or incinerate the waste in the future. Currently this waste is transferred into 55 gallon drums. One drum of carbon tetrachloride waste was in storage. Well W-11 is recovering most of the carbon tetrachloride - about 5 to 7 gallons per week.

Sulfuric acid demister waste is generated from the filtering of sulfuric acid mist. The waste is stored in drums in the hazardous waste storage area (See photo #18). This curbed area is now covered by a 3-sided fiberglass shed.

South of the hazardous waste storage area (see photo #19) were 20 gallon drums of waste paint booth filters and overspray (see 9/20/83 inspection report). As of the date of the inspection, incomplete analytical data (see attached) indicated this waste was nonhazardous by characteristic and by listing. Mr. Kady indicated that Allied may declare the waste hazardous pursuant to 721.121(a)(2). It appeared as if this declaration would be precautionary. Analytical data inspected did not include E.P. Toxicity data.

During the inspection of 9/20/83, a partial barrel of "M-17" solvent, and a partial barrel of alpha-methyl styrene and water were in storage. These wastes were disposed of in May 1984 (see attached manifests #0707272 and 0707273). The waste "M-17" solvent was determined to be waste methyl-ethyl ketone. These 2 wastes were listed in the facility's annual report.

In the 10/20/83 CIL, it was recommended that Allied revise their Part A application to include waste streams not previously identified. As of the inspection date, these revisions had not been made. In addition, it appears that additional wastes will have to be added. These include the containerized storage of sulfuric acid demister waste (D002 & D004), carbon tetrachloride (U211), and methyl ethyl ketone (F005). Mr. Kady said Allied's environmental staff in New Jersey was still reviewing the Part A revisions.

Mr. Kady stated that they had not generated any K021 waste (spent antimony catalyst - see 9/20/83 report for more detail) since the last inspection.

Mr. Kady asked if the continuous flow of hazardous waste through the storage tanks constituted storage for more than 90 days. I replied that I would ask USEPA. Subsequent to the inspection, I called USEPA's Gale Hruska in Region V and the RCRA Hotline. They indicated that if Allied could prove that the residence time of the waste in the tanks was 90 days or less, Allied would not be subject to Part 265(725).

I received a copy of Allied's revised (2/84) closure plan (attached). A review of this plan after the inspection indicated an apparent violation of 725.215.

Apparent violations of 725.113 - 725.115(b) and 725.173(b) noted on 9/20/83 have been corrected.

Also attached to this report are photos and site sketch.

DCJ:jg

Attachments

cc: DLPC/FOS, Central Region